

CLASSIFIED ADVERTISEMENT

DEPUTY COMMERCIAL
TRAFFIC MANAGER

A DEPUTY Commercial Traffic Manager is required in the Traffic Department.

He will be responsible for the direct supervision of all sections of the department including routine costing and rates, connected with road, rail and docks traffic.

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This is the second advertisement and previous applicants need not re-apply.

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Superintendent, Personnel Services,

THE STEEL COMPANY OF WALES LIMITED,

(Steel Division),

Abbey Works, Port Talbot,

Glamorgan.

[Another Classified Advertisement appears on page 23]

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The Editor is prepared to consider contributions offered for publication in MODERN TRANSPORT, but intending contributors should first study the length and style of articles appearing in the paper and satisfy themselves that the topic with which they propose to deal is relevant to editorial requirements. In controversial subjects relating to all aspects of transport and traffic this newspaper offers a platform for independent comment and debate, its object being to encourage the provision of all forms of transport in the best interests of the community.

The Trolleybus

BY its detractors it has often been claimed that the trolleybus is a hybrid vehicle, offspring of both tramcar and motor bus. Recent research, however, shows that Dr. Werner von Siemens thought for many years as seriously of the possibilities of the electrically driven steerable road vehicle as he did of the electrically driven railcar. Although the railway won in the end, with a demonstration line at the Berlin Trades Exhibition of 1879, the trolley vehicle was not far behind. A design was ready in 1881 and a contraption resembling a four-wheeled dog cart was in operation on April 29, 1882, in Hallensee, a suburb of Berlin. Current was collected and returned through an eight-wheeled trolley which ran on the double overhead wires and was connected to the vehicle by a flexible lead. This feature was the stumbling block and it was not until Max Schiemann developed the use of twin rigid trolley poles twenty years later that any headway was made. A series of detailed articles appearing in MODERN TRANSPORT outlines the technical development of the trolleybus; it is of importance now to determine why, after a period of success in its selected sphere, its charms have waned, at least in this country.

Getting Going

IT had no easy passage to success, despite the attractions of electric operation which even in the early years of the century had established itself as reliable, comparatively silent and easy to maintain, with the immense advantage of using home-produced fuel. Electrical gear evolved for tramcars was proportionately very heavy on the trolleybus, which for a long period suffered from being regarded as a trackless tram rather than an electrically propelled bus. Hand-operated tramcar-type controllers were difficult for drivers to operate at the same time as they manipulated the steering of ill-balanced front wheels, usually of wooden artillery pattern long after the steel spoked wheel had been taken up by motor bus designers. There were legal difficulties, too; the Board of Trade pretended at first there was no such animal, that what they did not know about could not be the subject of regulations and that without regulations it could not be authorised. This was broken through after the Railless Electric Traction Company in 1909 staged a demonstration at the Colindale depot of the Metropolitan Electric Tramways. It led to the simultaneous opening of short routes in Leeds and Bradford on June 24, 1911. As indicated, designs were clumsy, one of the double-deck units evolved after the 1914-18 war looking like a nightmare fusion of tram and municipal dustcart. This grave defect was not remedied until C. Owen Silvers, then general manager at Wolverhampton, realising the potentialities of the vehicle, took a Tilling-Stevens motor

MODERN TRANSPORT
SEPTEMBER 10, 1960

bus with petrol-electric transmission in 1923, removed engine and dynamo and added trolleybooms, and so produced an acceptable and very successful lightweight trolleybus. Britain led the world and from 1926 onward, when Wolverhampton obtained large-capacity six-wheeled Guy trolleybuses, a never-ending stream of foreign visitors came to admire that and other undertakings. The first of them was the Burgomaster of Groningen in the Netherlands, a town which today has a busy trolley vehicle undertaking.

A Peak of Activity

FIRST thought of as a feeder to tramway routes, the improved breed of trolleybus soon showed itself capable of sustaining traffic routes entirely on its own and, what is more, of profitable operation. In this country a number of unremunerative tram routes was converted; two towns, Darlington and Ipswich, made a complete changeover from tram to trolleybus and then for over two decades relied solely on the latter vehicle for local transport. In 1931 it reached the Metropolis with the suppression of a number of London United Tramways routes around Kingston in favour of the more versatile vehicle. Its financial success made a great impression on the newly-formed London Passenger Transport Board, so much so that tramway development plans, such as the reserved track line to Uxbridge, were dropped and the replacement first of light traffic routes and then the entire tramway system was envisaged. By this time the 70-seat trolleybus was easily practicable and technical development of lighter, higher speed motors and of refined control gear had made the trolley vehicle into an excellent machine both from the viewpoint of the maintenance and of attracting the public to a speedy and comfortable service. Latterly trolleybuses have served as guinea pigs for the whole p.s.v. industry in respect of 30-ft. double-deckers on two axles and the 35-ft. single-deck vehicle. Before the war the chassisless double-decker was introduced through the trolleybus, in which problems of integral construction were simplified. British success led to imitative reintroduction in Germany and elsewhere, while British manufacturers have been responsible for installations from China to Peru and also provided abroad some specialised vehicles developed from the vehicle designed by J. Boothroyd Parker when general manager of the Tees-side Railless Traction Board and equipped to run as petrol-electric buses beyond the overhead wires.

Limiting Factors

THE wires, alas, are a limiting factor in the spread of the trolleybus. The motor bus operator has to make no such calculation as to costs of cables, substations, contact wires and poles before he starts a route; he pays no rates on his street furniture; he has a much less formidable battle to get permission to run; and irrespective of national policy, his imported fuel often compares favourably in price with traction current. Moreover his vehicles can be switched from urban service to country work or football excursions at weekends or on other occasions—a factor which swayed the choice against trolleybuses when they were considered in Bristol, for example. Even then the trolleybus would have had a more important place in our passenger transport affairs, or even have appeared as a freight carrier in the engaging way it does in rural Spain, had it not been for the hostility evinced towards it in Parliament, reminiscent of the earlier opposition at Westminster to the tramcar. The London Passenger Transport Board was deprived of the possibility of turning trolleybuses on the Embankment and of entering New Oxford Street for a terminal loop; "London was not made only for your trolleybuses, Mr. Thomas," was the classic remark of the chairman of the Select Committee on the L.P.T.B. Bill in 1937, Sir David Reid, after Mr. (later Sir) Theodore Thomas had given evidence on the traffic operating requirements. In the upshot the South London scheme was shelved and not resumed after the war, since motor buses were seen to be more convenient. The use of one type of vehicle on routes south of the Thames showed such economies from 1952 onwards that the doom of the London trolleybuses, cut by Parliamentary decree in so many cases to little more than short workings on motor bus routes, was both logical and inevitable. Similar considerations have applied elsewhere and today only a handful of large systems remains unimpaired. A pity.

NEWS SUMMARY

THE British Transport Commission and the Pressed Steel Co., Limited, gave the first public demonstration of the new Road-railer in London on Tuesday of this week, September 6.

The last slip coach to operate on British Railways was being detached at Bicester on September 9.

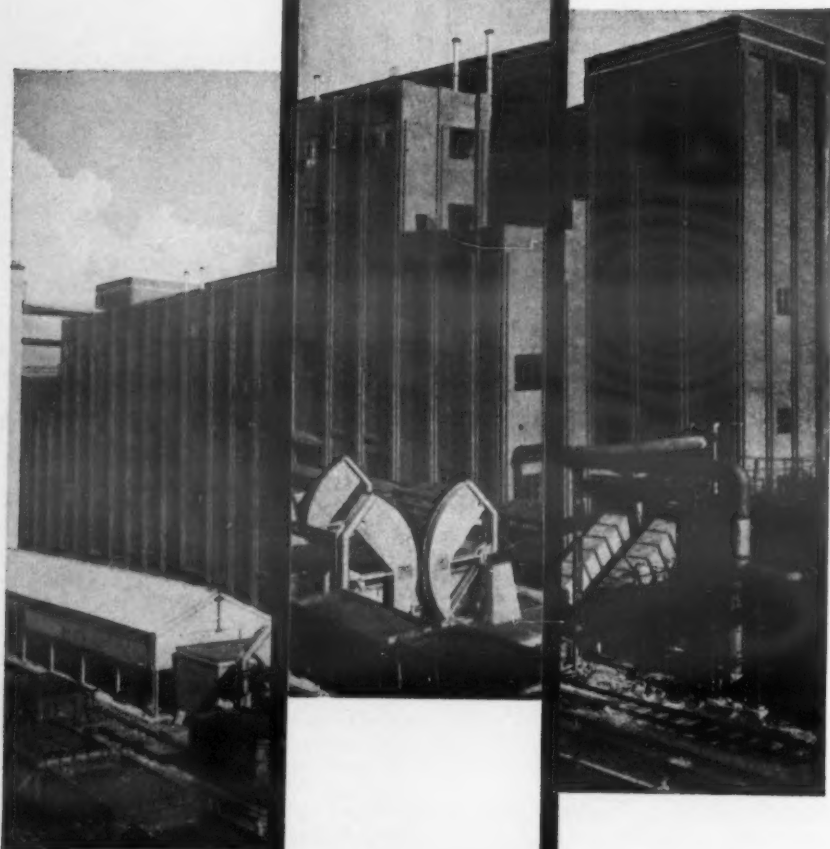
Leyland Motors, Limited, and Vauxhall Motors, Limited, have both announced important new vehicles which will appear at Earls Court. (Pages 5 and 15.)

The second of the new vessels for the Weymouth—Channel Islands service of British Railways was launched at East Cowes on September 6. She was named *Sarnia*.

Three line traffic managers are announced by the London Midland Region in a further stage of commercial and traffic operating decentralisation. (Page 23).

The demonstration run of the diesel-electric Pullman sets on the Western Region took place from Paddington to Swindon and back on September 5. Public service between Bristol and London and Wolverhampton and London begins on September 12.

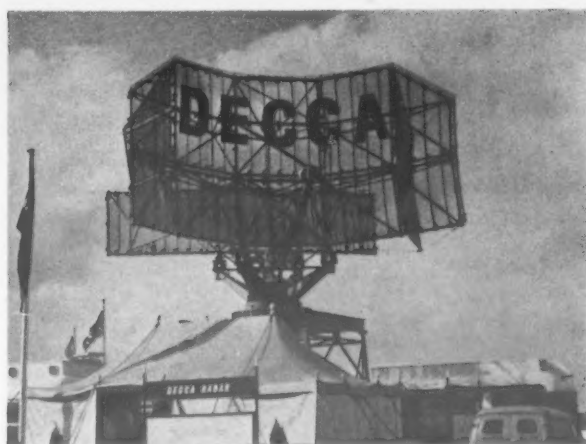
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Commercial Officer, London Midland Region, Euston Station, London NW1 (Euston 1234)
Commercial Officer, North Eastern Region, Headquarters Offices, York (York 53022)
Chief Commercial Manager, Scottish Region, 87 Union Street, Glasgow CI (Douglas 2900)
Commercial Officer, Southern Region, Waterloo Station, London SE1 (Waterloo 5151)
Commercial Officer, Western Region, Paddington Station, London W2 (Paddington 7000)



The back-to-back aerial system of the Decca Radar DASRI surveillance radar

FARNBOROUGH SURVEY

21st S.B.A.C. Display

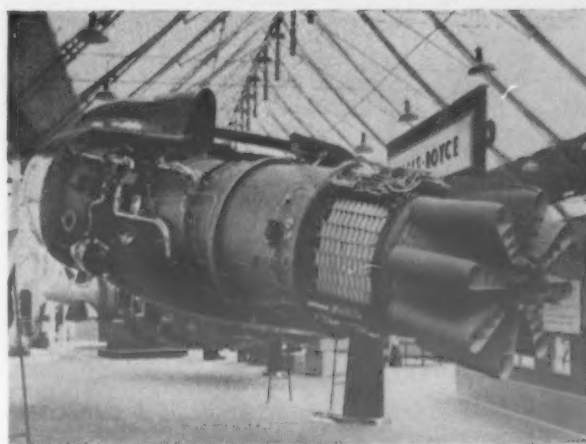
FUTURE MODELS ENVISAGED

the performance of the Twin Pioneer, and the Mark 3 which is flying in the display this year carried out almost the whole of its manoeuvres on one engine with considerable élan.

The next machine was the Lancashire Prospector 2 which is a development of the EP9 utility aircraft originally produced by Edgar Percival Aircraft and fitted with an American engine. Installation of a Bristol Siddeley Cheeta 10 has increased the power margin and it gave a display which included simulated crop spraying, a task for which it has proved particularly

popular. Still in the tradition of forward-looking names, the Pioneer and Prospector were followed by the Herald. This Handley Page aircraft has, of course, been seen before and since the last display it has been making prolonged demonstration tours in various continents. This year it demonstrates its short take-off run requirements by becoming airborne after taking on a load of troops before it reaches a tape across the runway 600 yd. from the aircraft development. Some representative types which are well within the realms of immediate practicability provided that sufficient interest is forthcoming among potential purchasers, while other models are of such machines as the de Havilland DH121, Vickers VC10 and Super-V10 and Short Britannic which are already on order for one or other of the British airways corporations or for the Royal Air Force. Thereafter come the immediate possibilities such as the BAC107 twin-jet for 50-59 passengers developed jointly by Hunting Aircraft and Vickers-Armstrongs (Aircraft) from the 107 project of the former. Power units would be two Bristol Siddeley ducted-fan BS75s and a similar choice is made for the Avro 771. Westland shows a model of the SRN2 hovercraft now under development and Short Brothers and Harland has not only a model of its SC7 light freighter but also a section of its fuselage.

Boulton Paul Aircraft has not for a long time had much connection with the civil market but on the stand this year is a model of a high-performance

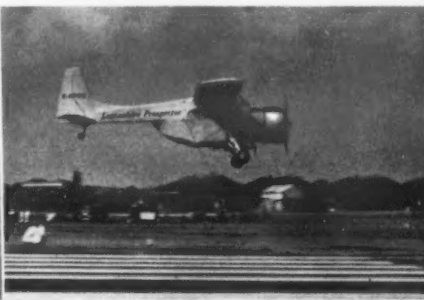


Rolls-Royce Conway pod for installation in a Boeing 707-420 complete with noise suppressing nozzle

THE 21st flying display and exhibition to be organised by the Society of British Aircraft Constructors opened at Farnborough on Monday which was the customary day for technicians and the Press. The first show since the major consolidation of the aircraft manufacturing industry, it could hardly be expected to show great evidence of the results of such moves in view of the relatively

popular. Still in the tradition of forward-looking names, the Pioneer and Prospector were followed by the Herald. This Handley Page aircraft has, of course, been seen before and since the last display it has been making prolonged demonstration tours in various continents. This year it demonstrates its short take-off run requirements by becoming airborne after taking on a load of troops before it reaches a tape across the runway 600 yd. from the

unit for helicopter installations, there has been parallel progress with the P1000 turboprop unit for smaller types of aircraft in the feeder-line category and development running is now in progress. In the jet engine field this maker has been devoting a great deal of attention to the DGJ10 version of the Gyron Junior which is destined for the Bristol T188 supersonic research aircraft and for which the special reheat system is shown publicly at Farnborough for the first time. The Alvis Leonides is



The Armstrong Whitworth Argosy, for which further orders have been announced this week; the Lancashire Prospector 2 with Bristol Siddeley engine; the Avro 748 making its first appearance at Farnborough and, right, the Vickers Vanguard climbs away set against some threatening cloud

short time which has since elapsed. Stands in the static exhibition had certainly been consolidated and some projects had obviously benefited from closer collaboration. Thus the twin-jet short range aircraft originated by Hunting as the 107 has now blossomed forth as the BAC 107 following coalescence with Vickers-Armstrongs on the design work. It may be mentioned here that a comparable twin jet—the Avro 771—appears in model form on the Hawker Siddeley stand, making it a little hard to understand the purpose of all the consolidation of aircraft manufacturing effort if one of the first fruits is to be the expenditure of time and labour on the production of rival designs.

The first day's flying took place largely in sunshine, the morning clouds having largely dissipated. Various participants which had been expected did not, in fact, materialise. The de Havilland Comet 4C and the Hovercraft did not, in the upshot, appear in the printed programme, but the Rotodyne which did was nonetheless an absentee. The first notable performer was the Short SC1 VTOL experimental aircraft with five Rolls-Royce RB108 jet engines. Four of these are mounted vertically for lift and one horizontally at the tail for propulsion. Last year when it appeared it demonstrated its lift capabilities, but this time it gave its first public demonstrations of transition between jet hovering and wing-borne flight. The chief test pilot of Short Brothers and

commencement of its run. This year's Vickers Vanguard is in Trans-Canada Air Lines colours. As before, it seems remarkably quiet in view of the power of the four Rolls-Royce Tyne. No sooner had the Vanguard landed after a precise and polished performance than the air seemed to be filled with Westland helicopters rushing hither and thither and, in one case, looping the loop. The final formation was not as polished as before but, nonetheless, it was most effective.

VTOL transport aircraft with a ducted-fan engine lifting system. Handley Page has a model of its 117, an all-wing air liner to carry 300 passengers and embodying the principle of laminar flow—a field with which this manufacturer has long been concerned. It is not intended that the aircraft should cruise at supersonic speed although it is claimed that laminar flow would still be effective at such speeds. Costs, including overheads, for the project envisage its ability to carry transatlantic

one of those engine designs which seem capable of continual uprating as the years go by and the current 531 range is rated at 615-640 b.h.p. In its own field the Bristol Siddeley Proteus looks like achieving the same kind of record and its performance in the Britannia is already remarkable as regards length of life. Examples of components are displayed after long periods of service.

We have already foreshadowed in our last issue some of the equipment and components which were



Vertical take-off: The Short SC1 undergoing public inspection and, centre, hovering just prior to transition; most of the Westland circus with the skinned Westminster nearest the camera

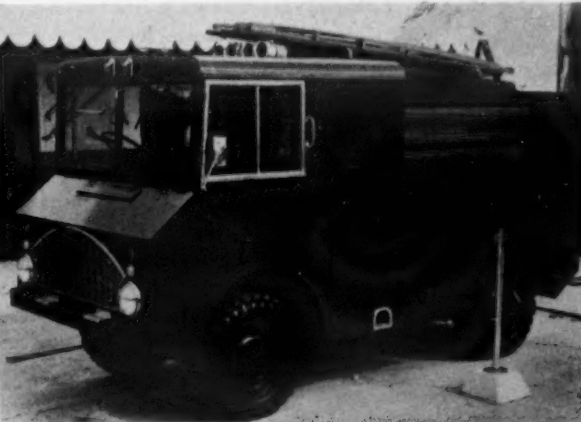
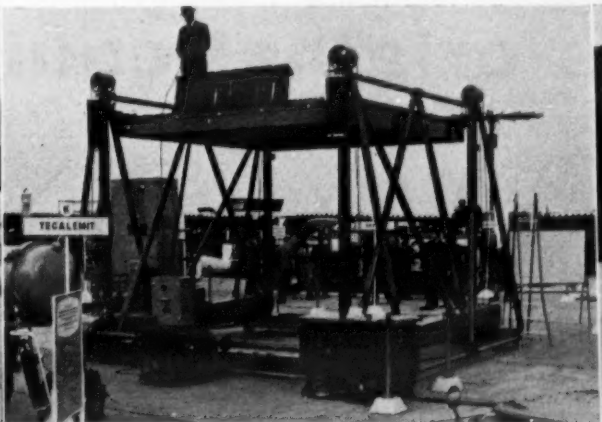
Thereafter came the Argosy, which was seen last year, but was this time celebrating the announcement of orders from B.E.A. and Riddle Airlines, and the Avro 748. This was making its debut at Farnborough and performed in a docile manner, while demonstrating by landing and taking off again, its ability to use restricted airfields. It is understood that internally it is remarkably quiet but externally it sounded unusually noisy for a Dart-engine aircraft. As already indicated, the de Havilland Comet 4C did not appear on Monday but it was announced on that day that a contract

passengers at £11 a head with a full payload. Rolls-Royce shows an interesting model of a projected high-speed jet lift aircraft for passenger service.

A Variety of Engines

Reference to this manufacturer brings the survey automatically to some of the power units displayed at Farnborough. The RB 141 by-pass jet engine has been running on test since last November and it is claimed that considerable progress has been made. Its initial rating is 15,000 lb. thrust with a maximum continuous thrust of 14,000 lb. It will

for the Miles Mark 2 fire engine, while on an infinitely larger scale one of the latest Mark 6A Pyrene crash tenders is on a nearby site. Also in the equipment area is one part of the Ministry of Aviation exhibit. This, in fact, covers a wide area not only in scope of subject but also in its whereabouts. There is a Comet used for test purposes in the static aircraft park, a standard control desk, a multi-channel traffic analyser and, particularly effective, a demonstration of telemetry for aircraft in the equipment display area. On the radar display area there is the latest precision approach



The Samlesbury Engineering Cargoveyor on a Morris-Commercial 3-ton chassis; the Short Brothers and Harland freight lift; the Miles fire engine on a forward control version of the Land-Rover

Harland, Limited, Mr. T. Brooke-Smith, staged a really impressive performance. After hovering in front of the president's tent, he achieved transition to normal flight and sped away at a rate of knots which virtually astonished a good many of the spectators. After flying past the enclosures, he made another circuit and then came into land, achieving the reverse transition very smoothly and descending gently as he reduced the thrust of the vertical engines.

Short Take-offs

Further development of the Alvis Leonides engine has enabled Scottish Aviation to enhance

was being negotiated for five of this type to be delivered for service with R.A.F. Transport Command during 1961-62. This manufacturing member of the Hawker Siddeley Group was, however, represented in the civil market with which it has been so long associated by the latest version of the Dove, the Mark 8, with increased power and enhanced performance.

Models of Future Types

The remainder of the flying display is devoted to military aircraft but, before turning to engines and equipment, some reference should be made to models appearing on stands in the exhibition as some could well point a definite path for future

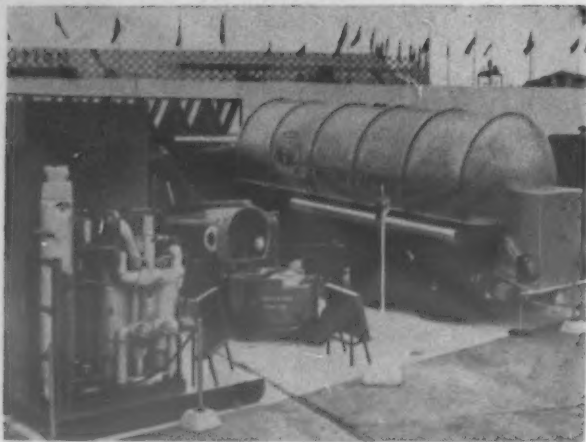
be installed in the Sud Aviation Caravelle 8 which should start coming off the production lines early in 1962. The Napier Eland turboprop engine is by now well known and we report elsewhere in this issue a further North American order for Conquairs fitted with these units. In the helicopter field the Gazelle is becoming equally well established and a 1-scale model of the 512 engine is on show for the first time. This version has been developed to meet the requirements of modern helicopters where all the reduction gearing is incorporated in the installation and power is taken directly from the free-power turbine output shaft.

While work has been going ahead on the development of the de Havilland Gnome H1000 turboshaft

radar equipment now in operation at London Airport and due shortly for installation at Gatwick, Prestwick, Ringway and Hurn, while in the static exhibition there is a stand with no fewer than nine examples of different work conducted by the Ministry's various establishments.

Before leaving the subject of radar, reference should be made to the display by Decca Radar on, as could be expected, the radar site. This has the Type DASRI air surveillance radar and for demonstration purposes tapes are used recording aircraft movements at Arlanda Airport, Stockholm, where the equipment is already in service. The use of tape is, in itself, something of an achievement and

(Continued on page 4)



The British Oxygen stand in the equipment section with a wide range of liquid oxygen ground equipment

certainly the results of this application of 10-cm. radar without deterioration in adverse weather conditions is most impressive. The two-beam system makes permanent echo suppression possible and circular polarisation gives very effective suppression of rain clutter throughout both beams and not merely close to the main axis.

New Glide Path Indicator

On view for the first time—in one-third scale model form—is the new G.E.C. visual glide path indicator unit designed for use in the Royal Aircraft Establishment's v.g.p.i. approach aid system,

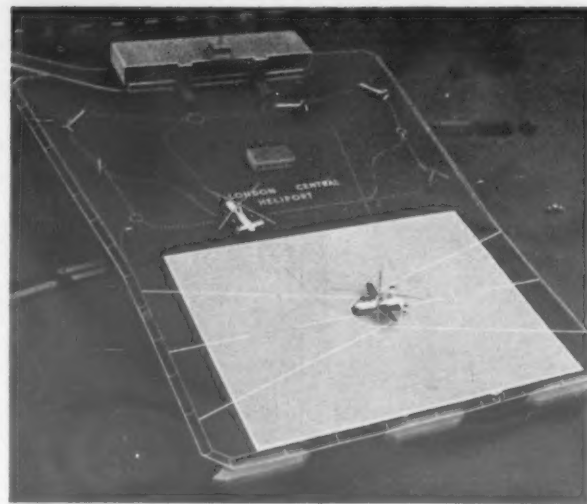
stage, and some of them employ a sealed module constructional technique which is claimed to confer very important advantages over the more conventional methods. At all stages of design and development of the new series the most intensive studies were, moreover, carried out to eliminate, as far as humanly possible, failure of the equipment in service. The second advance is in radar techniques. This maker has developed a parametric amplifier which, by virtue of a unique fully coherent pump, promises to give a considerable improvement in signal-noise ratio. The device, which is designed for use on 50-cm. radars, already has a far better

signal-noise ratio than can be obtained by using conventional thermionic valves, and is also relatively immune to damage by power break-through from the transmitter. In practical terms the incorporation of the new parametric amplifier into existing 50-cm. equipment can provide up to 25 per cent greater range coverage.

As has been the case for some years the Marconi companies exhibit on adjoining stands. Apart from the latest developments of already wellknown equipment, they provide this year two new pieces of special interest. One is an entirely new series of airborne communications equipments and automatic direction finders. These are fully transistorised, with the exception of the v.h.f. transmitter output

emphised by a British-made Rotorace directional gyro, which has now been in production in the United Kingdom for some months for military and civil operators. This unit, which is incorporated in particular in the new range of CL11 Gyrosyn compasses, is shown with its cover can cut away, but mounted inside a special plastics sealed container to exclude all dust from the movement. Another new design of gyro instrument, namely the vertical gyro type VG202, is also featured. This is shortly going into production for the DH121 system and for a number of instrument and control applications in military transport aircraft.

In massive contrast to these delicate instruments, although its applications must be comparatively accurate, there is an entirely new version of the wellknown Froude hydraulic dynamometer shown by Heenan and Froude, Limited. Designated the Froude PT20, it has a capacity of 6,000 b.h.p. at speeds up to 1,500 r.p.m. and is shown with a highly advanced type of control gear, specially developed to provide the particular torque/speed characteristics required in the testing of modern turboprop engines. For a contrast in both direction and application, save that seating is involved in both cases, there is the range of Lonsdale aircraft

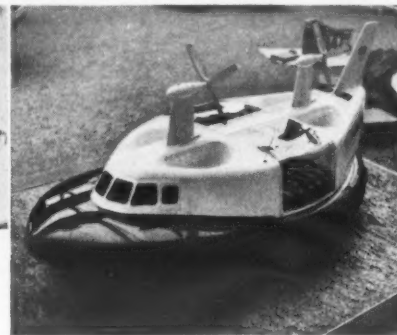


A model of a heliport for Central London figures on the Westland stand

Four wholly owned subsidiary companies of English Steel Corporation, Limited, Sheffield, show jointly items of interest from their very wide selection of high-quality steels and steel products manufactured for the aircraft industry. Drop forged components for airframes, engines and propellers are shown by English Steel Forge and Engineering Corporation together with examples of torsion bars applicable to the aircraft industry. Special steels used in aircraft production as well as a range of



Models for the future: The Vickers-Armstrongs section of the B.A.C. stand includes a freight version of the Super-VC10 in model form and also a model of the BAC107 twin-jet short range proposal. Different thrust applications are employed in a Boulton Paul Aircraft project for a VTOL air liner and in the Westland (Saunders-Roe) SRN2 Hovercraft



which is attracting much attention in the U.S.A. as well as in Britain. The ZA.707 visual glide path indicator unit is designed to emit a two-colour beam (red below and white above a given angle), this unit uses four standard 200-watt prefocus cap Osram lamps—as used in approach lights and available from stock on most aerodromes—and a reflector-colour-filter assembly rigidly mounted in the rear of the casing. The casing, which also forms the chassis, is of glass fibre construction and is split horizontally, the cover being removed for maintenance or lamp replacement. Overall height of the unit is only 10½ in.—low enough to miss the pro-

seats displayed by Aircraft Furnishing, Limited. As last year it includes the Flyweight double and triple units which combine high shin clearance with the tip-up seat and very low weight. For the first time, however, there is the Lonsdale luxury first-class double seat. In double and triple form the same chair can be used at de luxe 54-in. pitch, with 67½ deg. recline, leg-rests and hook-on front tables, or, at closer first-class pitch, with limited recline and tables attached to the seat back. In double form it weighs 55 lb. which may be compared with the 36½ lb. of the double and 51½ lb. of the triple Flyweight units

high-speed, carbon and alloy tool steels are displayed by English Steel Rolling Mills Corporation, and English Steel Tool Corporation is represented by a comprehensive range of engineers' cutting tools, which includes examples of skin counterbores and rivet shaving cutters. A selection of permanent magnets for instruments, radar, radio and other electrical equipment used in the aircraft industry is exhibited by English Steel Magnet Corporation. General Precision Systems, Limited, has brought the famous Link trainer right up to date and is exhibiting its four to eight station automatic radio aids unit (Series 2).

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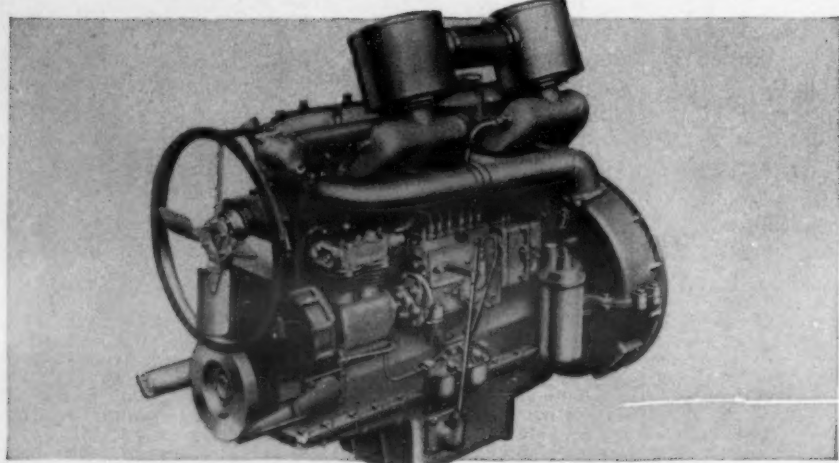
New Leyland

'Power Plus'

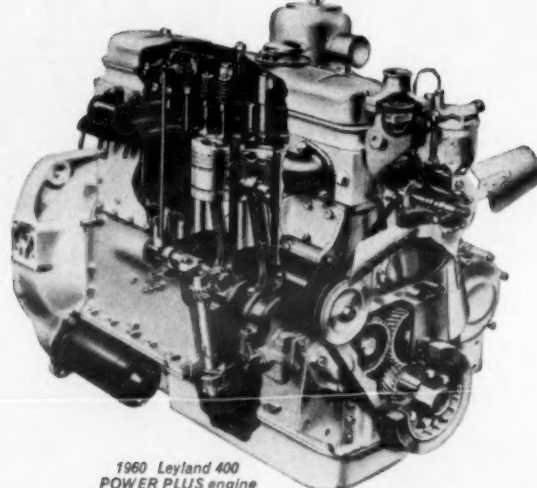
SERIES again fit

VANDERVELL LEAD INDIUM BEARINGS

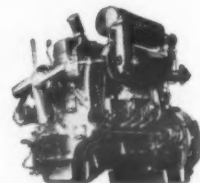
as original equipment



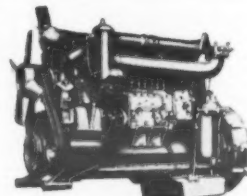
1960 Leyland 600 POWER PLUS engine



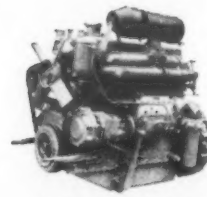
1960 Leyland 400 POWER PLUS engine



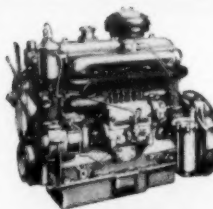
Early 1940's Leyland 7.4 litre engine



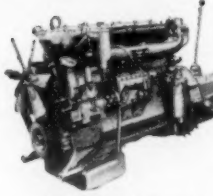
1947 Leyland 600 engine



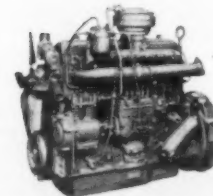
1948 Leyland 300 engine



1951 Leyland 300 redesigned to 350 cu. in.



1953 Leyland 680 engine



1958 Leyland 375 engine

SEE YOUR REPLACEMENT BEARINGS HAVE THIS MARK



REGD TRADE MARK

LEYLAND PLUS

New Heavy-Duty Goods Range

LION REAR-ENGINED SINGLE-DECKER

NEW vehicles announced this week by Leyland Motors, Limited, for introduction at the forthcoming Earls Court exhibition include a heavy-duty range for from 14 to 24 long tons gross weight, replacing current Beaver, Hippo and Octopus chassis, a repowered Super Comet also for 14 tons gross weight solo and a new rear-engine single-deck passenger chassis that revives a famous Leyland name of the past—the Lion. Due for

organised into no fewer than 15 different types for haulage, tipper and tractor applications. For the record, a table showing type designations and principal features is given on this page. All are forward-control (cab over engine) chassis available immediately with right-hand control and in the near future to be marketed



New Power-Plus Octopus with plastics Vista-View cab and (on left) Beaver articulator with identical pressed-steel cab—note low step ahead of front wheel and large mirror. A demonstration Atlantean double-decker forms the background

immediate release on the home market, the new Leylands will also be in production with left-hand controls for overseas markets in a few months' time.

Power-Plus Diesel Engines

A common feature of all the chassis is a new range of diesel engines named Power-Plus which, while retaining all the features that have given Leyland diesels of the recent past their remarkable length of life between overhauls, provide substantially greater power and fuel economy made possible by a new toroidal form of direct-injection

with left-hand control. The standard power plant throughout the range is the Power-Plus O600 engine, while the Power-plus O680 is optional.

A feature of the cooling system, which employs series-flow water circulation and is pressurised to 4 p.s.i., is an effective non-recirculatory air flow throughout the radiator. The tendency for warm air to recirculate around the fan and flow back through the radiator is prevented in the new installation by using a close-fitting fan cowl sealed by rubber around the radiator stack. The radiator itself, a four-row Morris-type stack, is mounted on the frame front crossmember on rubber bushes, while

NEW LEYLAND HEAVY GOODS RANGE WITH POWER-PLUS ENGINES

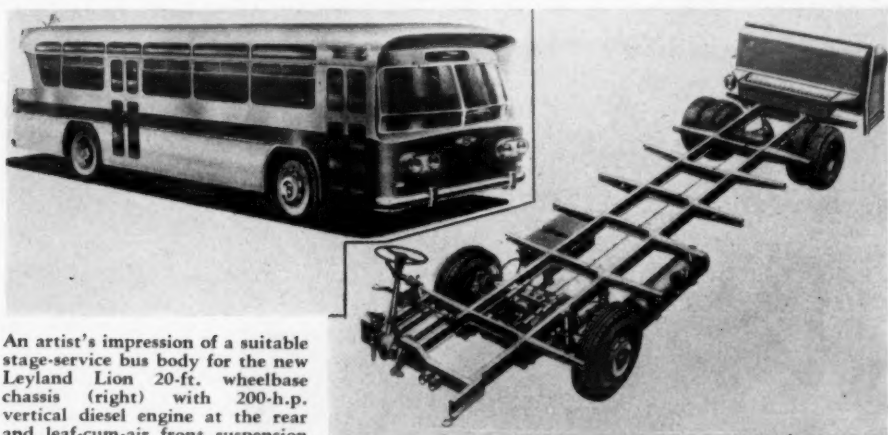
Model	Type	Wheelbase	Overall Length	Back of Cab to End of Frame	Chassis & Cab Weight (Dry)	Estimated Payload Plus Body	Maximum Gross Rating
BEAVER 4-Wheel	14B.11R & L Haulage	17 6	29 11½	24 2½	100½	174½	280
	14B.12R & L Haulage	15 0	26 11	21 5½	95½	179½	280
	14B.13R & L Haulage	13 6	23 11	18 5½	94½	180½	280
	14B.14R & L Haulage	12 0	21 2½	14 7½	94½	179½	280
10.00-20 14-ply Tyres	14B.17R & L Tipper	8 0	15 9	10 0½	89½	—	480
	14B.17R & L Tractor	8 0	15 9	10 0½	89½	—	Articulated Veh.
HIPPO 6-Wheel	20H.12R & L Haulage	17 0	29 11½	24 5½	122½	272½	400
	20H.13R & L Haulage	14 9	27 2½	21 4½	121	274	400
	20H.14R & L Haulage	17 0	29 11½	24 5½	132	262½	400
	20H.15R & L Haulage	14 9	27 2½	21 4½	130½	263½	400
10.00-20 14-ply Tyres	20H.16R & L Tipper	12 6	23 1	16 9	129½	265½	400
	20H.16R & L Tractor	12 6	23 1	16 9	129½	265½	400
OCTOPUS 8-Wheel	24.09R & L Haulage	17 0	29 11½	24 5½	133½	341½	480
	24.010R & L Haulage	14 9	26 10½	21 4½	132½	342½	480
	24.011R & L Haulage	17 0	29 11½	24 5½	142	332½	480
	24.012R & L Haulage	14 9	26 10½	21 4½	141	334	480
9.00-20 12-ply Tyres	24.013R & L Tipper	14 9	25 4	19 0	140½	334½	480
	24.013R & L Tractor	14 9	25 4	19 0	140½	334½	480

combustion chamber (named Spheroidal by Leyland), a special type of piston and a new design of ports and manifolds. By these means, improved breathing and more complete combustion have brought about an overall gain in efficiency of 33 per cent compared with earlier counterparts, which can be taken entirely as increased power output or partly in increased power and partly in lower fuel consumption.

The three Power-Plus series engines developed for the new chassis are the Power-Plus O680, of

engine, clutch and gearbox are mounted as a unit, also in rubber.

Drive is through a Leyland 16½-in. dia. single dryplate clutch, with moulded linings having a total area of 273 sq. in. and hydraulically operated withdrawal. A feature of the withdrawal mechanism is a long-stroke slave cylinder through which adjustment for lining wear is made automatically. When the 200-h.p. engine is specified, air-pressure assistance is provided for clutch withdrawal through a diaphragm servo controlled by a



An artist's impression of a suitable stage-service bus body for the new Leyland Lion 20-ft. wheelbase chassis (right) with 200-h.p. vertical diesel engine at the rear and leaf-cum-air front suspension

667 cu. in. (11.1 litres) capacity set to produce 200 b.h.p. (net installed) at 2,200 r.p.m. and 548 lb./ft. torque at 1,200 r.p.m.; the Power-Plus O600 of 597 cu. in. (9.8 litres) capacity, designed as a maximum-economy unit to give 140 b.h.p. (net) at 1,700 r.p.m. and 438 lb./ft. torque at 1,200 r.p.m.; and the Power-Plus 400S, with a capacity of 399 cu. in. (6.54 litres) set to produce 125 b.h.p. at 2,400 r.p.m. and 300 lb./ft. torque at 1,600 r.p.m. An innovation in the two faster-running engines is the use of porous-chrome cylinder liners. Detailed descriptions of the new engines will appear in a later issue.

Described by Mr. D. G. Stokes, Leyland sales director, as the most comprehensive range the company has ever produced, the heavy-duty range comprises three basic chassis—the two-axle Beaver, the three-axle Hippo and the four-axle Octopus,

valve in the linkage. With the servo, a clutch pedal pressure of only 35 lb. is required.

A new heavy-duty five-speed constant-mesh gearbox has been specially engineered by Leyland to take the high torque of the Power-Plus engines. It has a cast-iron casing supporting larger-than-usual mainshaft and layshaft, each with additional central roller bearings, and wide gears of hardened alloy steel formed with deep thick teeth. The box is designed to incorporate optional overdrive sixth and extra-low gears, either or both of which can be specified. All moving parts of the gearbox are positively lubricated by integral gear-type pump. Standard five-speed ratios are 7.243, 4.614, 2.755, 1.69 and 1 to 1 forward and 6.5 to 1 reverse. Optional overdrive has a ratio of 0.766 to 1 and the additional low gear gives 9.33 to 1.

(Continued on page 14)

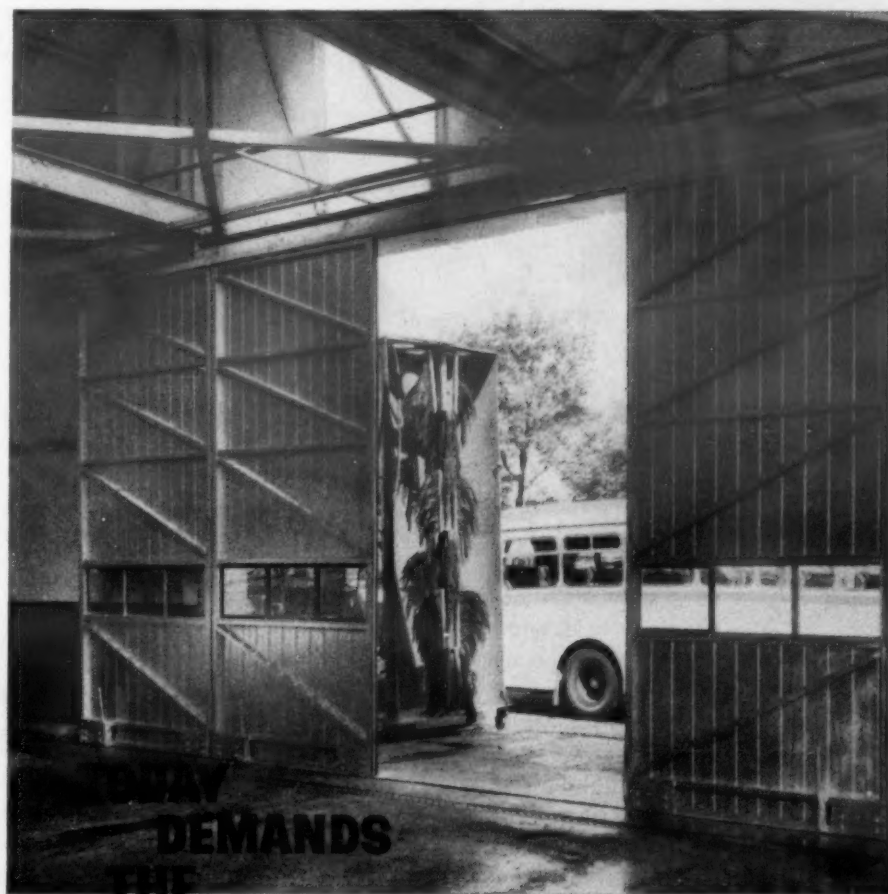


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Architect: H. A. F. Spooner, L.R.I.B.A.

DEMANDS THE STREAMLINED LOOK

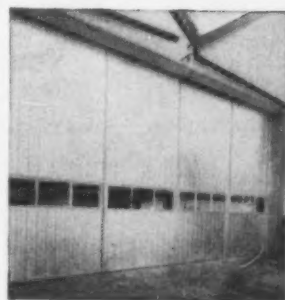
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8-wheeled Octopus, 14' 9" & 17' 0" wheelbases for haulage (low-weight or high-duty models). 14' 9" w/b high duty tipper.



*introduces an entirely
new 14/24 GVW range*

POWER
PLUS
Series



6-wheeled Hippo, 14' 9" & 17' 0" wheelbase for haulage (low-weight or high-duty models). 12' 6" w/b high-duty tipper.

- 6-cyl. Leyland 'Power-Plus' diesels with new spheroidal heads. 140 h.p. at 1,700 r.p.m. with economy setting or 200 h.p. unit with power-assisted clutch.
- New Leyland 5, 6 or 7-speed gearbox with maximum torque and 20 h.p. power take-offs.
- Leyland double-reduction rear axle with second reduction in hubs. Single or twin drive incorporating lockable third differential on multi-wheelers.
- Diaphragm operated cam-type air brakes. Power-assisted hand brake.
- New Leyland non-reactive low-weight suspension or trunnion mounted free-end springing on multi-wheelers.
- Power-assisted Marles cam-and-double-roller steering.
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4-wheeled Beaver. 13' 6", 15' 0" & 17' 6" wheelbases for haulage. 12' 0" w/b tipper, and 8' 0" w/b tractor.

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IN DOUGLAS TODAY

Venue of M.P.T.A. Conference

CONTRAST OF ANCIENT AND MODERN

IT is just 25 years since the Municipal Passenger Transport Association held its annual conference in the Isle of Man. Time has perhaps dealt more leisurely with Douglas Corporation Transport Department, the host next week, than with most municipal transport departments in this chequered quarter-century and indeed tradition exerts a powerful influence as seen in the promenade horse tramway today, as popular with the thronging holidaymakers as at any time since its inception no less than 84 years ago.

Growth of Services

Municipal transport in Douglas was inaugurated in 1902, when the horse and cable tramways were acquired. After the first horse buses, motor buses were introduced on feeder services in "the month war broke out" — August, 1914, and replaced the Upper Douglas cable tram service in 1930. Since he took over in 1932, the general manager of the undertaking, Mr. C. F. Wolsey, M.Inst.T., has seen the route-mileage progress from 9 miles only to 54½ miles; the annual revenue has jumped from £40,000 to £112,000. In common with almost all coastal resorts Douglas experiences to the full the seasonal swings of activity. The annual influx at the holiday season means that the normal weekly revenue of £1,000 in the off season is inflated to a maximum of £8,500 in the summer months. In this connection the sailings of the steamers provide an interesting index to the department's activities. Whereas in the off season there is only one steamer departing and one arriving on weekdays, at the height of the summer season there are not less than six arriving or departing daily and on Saturdays a peak of 10 arrivals and nine departures is reached.

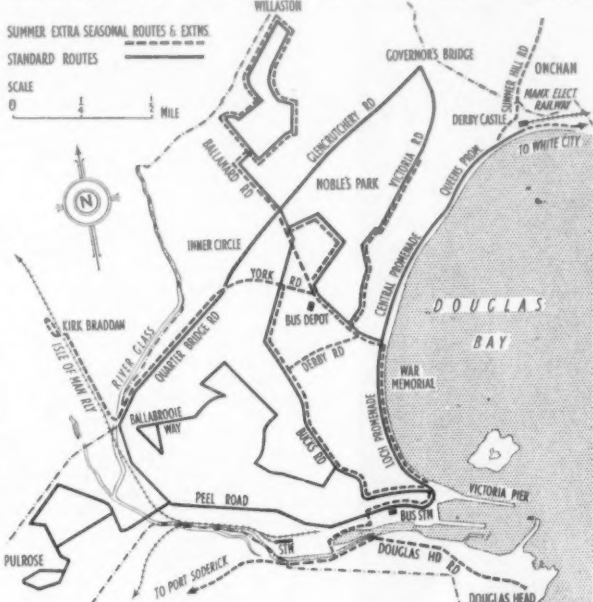


Diagram of Douglas Corporation routes

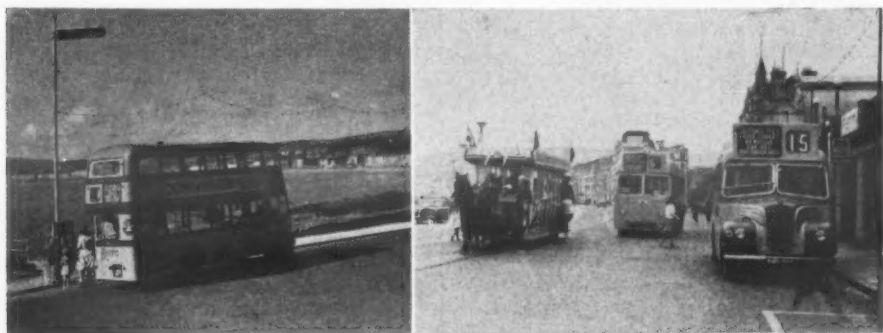
There is close liaison with the Manx Electric Railway Board whose coastal railway from Derby Castle (at the borough boundary) to Ramsey provides magnificent views as well as the experience of a ride on the branch to the top of Snaefell Mountain, 2,034 ft. up.

Central Bus Station

Another important development which made itself known particularly as air traffic to the island was increasing considerably was the need for a central bus and air terminal station. Most of the land available had been used as a car park. As far back as 1933 the then borough surveyor and the

transport manager were asked to submit a scheme for a bus station in the central area of the town. The present one in Lord Street has been in use since 1959 and permits the concentration of all routes into this area with obvious advantages to the travelling public. It is shared by the Corporation and I.O.M.R.S. buses and airport buses. A still more recent development in which the department has been associated concerns the new layout for operations at Victoria Pier when the new buildings have been completed. The plans have been finalised.

In common with most undertakings Douglas has had to bear the brunt of falling traffic through circumstances which are all too commonly known today. During the past 10 years the number of motor cars in the island has increased by 40 per cent and motor cycles by 100 per cent, in addition to which there are the problems arising from television. The Borough Treasurer recently reported that estimating the yearly finances outcome of the transport department is now a "hazardous occupation" and in order to



Latest A.E.C. Regent Mark V with M.C.W. body at White City terminus (outside the Douglas boundary); right, on the Promenade, a horse car, and A.E.C. Reliance and Guy one-man buses, both with Mulliner bodywork, caught in pleasing juxtaposition

Although normal bus operations in Douglas are between 7 a.m. and midnight, on Saturdays operations start at 4 a.m. As a matter of necessity the local working agreement provides for flexibility at the weekend.

An important postwar landmark in the history of the undertaking has been the working agreement with the Isle of Man Road Services, Limited, in 1957, regarding certain routes. This was preceded in 1955 by a scheme of re-routing of existing Corporation services to produce a more satisfactory pattern and today the basic standard routes remain for all-the-year-round working. It was in 1953 that discussions were opened on the question of joint operations between the Corporation and Isle of Man Road Services, and an agreement was reached four years later. It provided the public with every facility for boarding the buses of either party and for the revenue and mileage to be pooled and divided on a percentage basis, for services covered by the agreement.



Corporation A.E.C. and Isle of Man Road Services Leyland buses at Lord Street bus station just before its completion. Away in the top right corner is seen the Douglas Head terminus, served during the summer season

Out-Running

The Corporation was able to take a share in services operating two miles beyond the traffic boundary of the borough. This included routes to Onchan, Willaston via Broadway, Port Soderick and Quarter Bridge, extended to Kirk Braddan Church on Sundays. The Ridgeway Road service was extended to Onchan (Alberta Drive). With some adjustments which have occurred during the past year or so, that is broadly the basis of operations today.

balance its budget it has to seek relief from the rates.

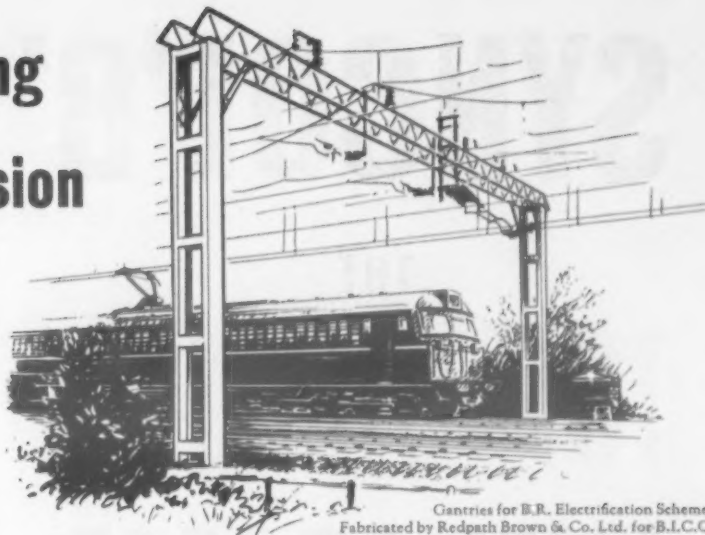
Bus Rolling Stock

In a full year the impact of the 1960 wage award and the reduction in the working week is estimated at £10,000, and it is not surprising that Douglas had to seek an increase in fares on the buses to 5d. for a through fare for an average distance of two miles with a 4d. stage for half distance; as the horse tram fares are at present at the limit of 6d. through-out, with a 4d. stage, they remain unaltered. During the past three years, four A.E.C. double-deck buses, two A.E.C. single-deck buses and five Guy one-man buses have been purchased for which a loan of £34,000 had to be obtained and 75 per cent of this amount is still outstanding.

Most of the new buses have a large destination indicator, front and rear. For each route five points are displayed, the last being the terminus. For example, on the promenade route from Victoria Pier to White City the following are shown: "Promenades—Villa Marina—Palace—Derby Castle—White City." To accommodate these large displays the blinds are 80 ft. in length. There is no doubt that these displays greatly assist the visitor about the town, to and from his hotel or boarding house and places of interest. On the stubby Guy normal-control single-deckers the lofty protrusions of the destination boxes above the roof at front and back earned for them the irreverent but ingenious nickname "Wolsey's Camels."

(Continued on page 8)

Fighting Corrosion



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DOUGLAS TRANSPORT

(Continued from page 7)

The present bus fleet consists of the following:

Chassis and Bodywork	Seating Capacity	No.
Guy-Perkins-Mulliner (one-man) ..	26	5
Leyland Comet-Park Royal ..	30	3
A.E.C. Regal Mark IV-Willowbrook ..	38/42	2
A.E.C. Reliance-Mulliner ..	42	2
A.E.C. Regent-Northern Counties ..	52	6
A.E.C. Regent Mark III-Northern Counties ..	55/56	18
A.E.C. Regent Mark V-M.C.W. ..	56	4
Daimler-Duple ..	56	3
		Total 43

The 31 horse trams are today carrying some 1½ million passengers on their 1½ mile route and the stock is as follows:

5 saloon cars ..	30 seats
6 bulkheads (open sides, covered tops) ..	40 seats
6 sunshades (open sides, covered tops) ..	32 seats
5 toastracks (fully open) ..	40 seats
6 toastracks (fully open) ..	32 seats
3 all-weather cars ..	34/40 seats

History of Horse Trams

There is a stud of 75 horses and financially they pay their way. During the winter months, when the service is suspended, the tram track between Victoria Pier and Broadway is used for the parking of vehicles. This first tramway in Douglas was authorised in 1876 by the Douglas Bay Tramway Act. Animal traction only was permitted, unless otherwise approved by the Board of Trade, and the route scheduled was Queen Victoria Pier to Strathallan Crescent. In 1884 the tramway was sold to the Isle of Man Tramways Company and 10 years later it was acquired by the Douglas and Laxey Coast Electric Tramways, Limited, which thereupon changed its name to the Isle of Man Tramways and Electric Power Co., Limited. The Corporation purchased this line and the Upper Douglas cable tramway (authorised in 1895) in 1901. Over the years the stock of horse cars has declined from 46 (in 1935), but electric lighting has been installed in them and they run on roller bearing axleboxes. The last track relaying programme was completed in 1953.

The department has purchased additional land for the erection of an additional bus garage at the existing depot at Waverley Road—York Road and there is a parking site in Lord Street which obviates much empty running to the garage. The basic all-year-round bus routes are as follows:

Promenades:
Willaston via Upper Douglas;
Pulrose and Spring Valley;
Inner Circle via Quarter Bridge;
Inner Circle via Governors Bridge;
Inner Circle via Upper Douglas;
All Saints and Ballabrookie

and in addition to these for the summer season:

Promenades extended to White City;
Promenades extended to Onchan (Alberta Drive);
Upper Douglas—Nobles Park;
Douglas Head;
Port Soderick;
Derby Road;
Request circular tour (nine miles);
Kirk Braddan Church open air service.

During what is termed the off season, there is still a considerable amount of activity in the department. During the autumn months the staff holidays are undertaken and the buses undergo their periodical examination for repairs and renewals ready for the annual p.s.v. examination which takes place from February onwards. Work on the horse trams commences in March. Of course, there are not a few off-season events on the island, probably four conferences each year, trade and other exhibitions and the international T.T. and Manx Grand Prix races which bring in welcome revenue.

ALUMINIUM BONDERISING

Range of Pyrene Treatments

RECENTLY introduced by the Metal Finishing Division of the Pyrene Co., Limited, a new range of treatments for aluminium and aluminium alloys comprises Bonderite 710, Bonderite 701, Bonderite 740 and Aluma Etch 391. These new Bonderising techniques are said to provide an extremely economical low-temperature method of coating aluminium and to convert the aluminium surface into a thin amorphous oxide-chromate coating which is integral with the metal itself.

Bonderite 710 coatings are of an attractive well-defined golden colour, though variations in tone may occur according to the different alloys used. The applications and potentialities of this process are extremely diverse. It will treat with equal efficiency such varied subjects as small aluminium parts and continuous strip. In fact, Bonderising is in use on strip lines in this country for the treatment of aluminium strip at over 60 ft. per min. Processing times are exceptionally low.

Bonderised aluminium can, if necessary, be formed after painting. The amorphous Bonderite coating, itself inseparable from the metal surface, tightly bonds the paint so that highly complex forming operations can be performed without impairing paint adhesion.

Bonderite 701 and 740

The Bonderite 701 process converts the aluminium surface into an amorphous oxide-chromate coating of a pleasant green colour which is integral with the metal and is light-fast. The coating, in its own right, offers excellent corrosion protection to aluminium and aluminium alloys. Bonderite 701 has many architectural applications where durability and colour count.

Bonderite 740 is another oxide-chromate treatment providing a coating which is both an ideal base for organic finishes, and a corrosion-resistant film in its own right. It can be applied by immersion, spray or in a continuous strip line. It has been specially developed for treating aluminium and aluminium alloys in mixed production with steel.

Aluma Etch 391 is a scale-free controlled alkaline aluminium etchant for uniformly etching the surface of aluminium in an immersion bath. Unlike other etching solutions, where dissolved aluminium reacts with caustic soda to form insoluble sodium aluminate, the formulation of Aluma Etch prevents the conversion of sodium aluminate into sludge. The use of Aluma Etch, therefore, produces no suspension and no precipitate.

Moreover, once the desired degree of etch has been established for a particular alloy, operations may be easily controlled to produce the required etch, uniform and evenly diffused, no matter what the size of surface area to be covered. Aluma Etch 391 is applied by immersion and the parts to be treated are immersed in the hot solution for a predetermined time to remove soil and to produce the required degree of etch.

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PRESENT STATE OF RAILWAY ELECTRIFICATION

3—Electric Railways in Great Britain Today and for Tomorrow*

By F. J. G. HAUT, B.Sc.(Eng.), A.M.I.Mech.E.

A PART from the 20 locomotives of the Metropolitan Line of London Transport used mainly on passenger service from Baker Street to Watford and Rickmansworth, and the Vincent Raven locomotives of the North Eastern Railway, there were no electric main-line locomotives in Great Britain until 1939. It was only in the thirties that the then chief mechanical engineer

refresh the memory of readers by mentioning the following facts.

Simple Locomotive Layout

The mechanical layout is very simple; it has a single body with driver's cabs at both ends, welding technique being used extensively for fabricating the various parts. The body rests on two bogies



One of the Bo-Bo electric locomotives built for the Metropolitan Railway in 1904-06 and reconstructed in 1922

of the former London and North Eastern Railway, the late Sir Nigel Gresley, designed locomotives to form the basis of the motive power for the Manchester—Sheffield line across the Pennines. Two types, a Bo-Bo and a Co-Co were designed, and all types of traffic were to be hauled electrically. The capacity of this very busy main line was thereby greatly increased.

Manchester to Sheffield

After the outbreak of war in 1939, all work was stopped except the completion of the first locomotive

which are coupled together and carry all traction gear, thereby relieving the body and the bogie pivots of all stresses except weight bearing. The electrical part is the usual one on d.c. locomotives; it consists of two pantographs, switchgear, and four 465-h.p. force-ventilated motors. The control system consists of electro-pneumatic resistances and series-parallel control, with electro-pneumatic contactors giving 10 economic running speeds. The traction motors are axle-hung and drive through resilient gearing.

The seven Co-Co locomotives were delivered in



The third of the experimental Co-Co mixed-traffic locomotives for service on the Southern Region of British Railways

tive; it only resumed during 1947. The following lines were electrified, covering 75 miles of route and 330 miles of track, the main sections being

Manchester London Road Station to Sheffield (Rotherwood Sidings) and Penistone (Barnsley Junction) to Wath via Worsborough with a number of branch lines and sidings.

A stock of 65 electric locomotives was built, 58 of the Bo-Bo wheel arrangement, and the remaining seven of the Co-Co type. Eight three-coach multiple-unit electric trains are also used on suburban operations between Manchester and Glossop.

The Bo-Bo prototype was completed at

1954. As in the case of the Bo-Bo engines, the mechanical parts were built at Gorton Works of British Railways and the electrical equipment by Metropolitan-Vickers Electrical Co., Limited, of Manchester. These locomotives are mainly intended for passenger services and are therefore provided with an electric boiler for train heating; their maximum speed is 90 m.p.h. The locomotives are 59 ft. long over buffers. Total wheelbase is 42 ft. 2 in., and the distance between bogie centres is 30 ft. 6 in. Weight in working order is 102 tons.

An interesting and unusual Co-Co design was developed by the former Southern Railway for



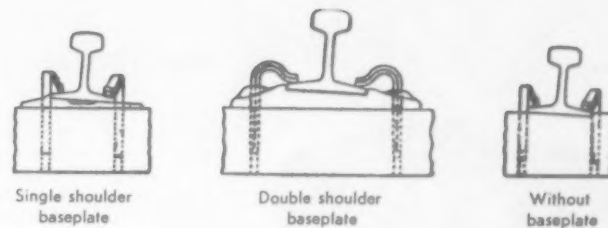
Seven Co-Co locomotives were built primarily for passenger work on the Manchester—Sheffield—Wath line of the former L.N.E.R. This one is hauling the Liverpool—Harwich boat train near Oughty Bridge

Doncaster and ran trials on the Manchester—Altrincham line in 1941 and 1947. In September, 1947, it was sent to the Netherlands (also electrified with 1,500 volts d.c.) and it ran over 200,000 miles in Holland, with considerable success. The Bo-Bo machine is a very simple and robust locomotive, fully suited to the hard working conditions to which it is subjected. The type has, for example, proved capable of hauling trains of 1,750 tons, and of starting such trains on gradients of 1 in 80. The maximum speed of the Bo-Bo locomotive is 70 m.p.h. These locomotives have been described in great detail and I only wish to

three mixed-traffic locomotives. These locomotives take their current from conductor rails, and thus need very unusual design features. For example, to avoid trouble from stalling, it was necessary to provide a continuing tractive effort to bridge the gaps in the conductor rail system; these gaps occur mostly at the end of stations, just where, when starting, the largest output is required. To overcome this difficulty, the locomotives have a booster motor generator control with flywheel. Experiments were also made with overhead wires in sidings. The first locomotive was built in 1943, and later two further locomotives were developed,

(Continued on page 19)

ELASTIC RAIL SPIKES



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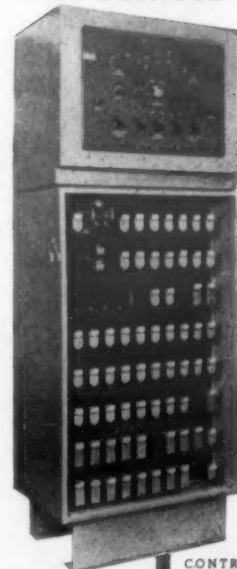
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Greater speed and simplicity in remote signal control



View of Type 'S' Control panel for remotely operating a station on a single line of railway. Front cover has been removed to show relays.

WITH THE

AEI-GRS Type S remote control system

The Type S remote control system, developed by AEI-GRS, provides a swift, simple and economical means of remote control and indication, using a minimum of apparatus. Designed specifically for remote control of a single location this 'synchronous stepping' code system is based on a unique principle employing the free swings of two mechanical oscillators—one at each end of the circuit—to create the steps of the code.

METHOD OF OPERATION

CONTROL action completed in 1 second

To control a field device, a switch on the control machine is moved to set up the appropriate code in the control office application unit. This code is transferred to the stepper unit and transmitted over the line circuit to the field apparatus. The field stepper unit on receiving the code applies it to the field application unit, which responds to the particular code message and controls the function relay operating the field device. This entire control operation takes approximately one second to complete.

INDICATION given in 2 seconds

When a field device changes position, it notifies the field application unit which automatically starts the stepper unit transmitting the appropriate code back to the control office, where an indication light on the control panel diagram shows the new position of the field device. Indication is completed in about two seconds.

SIMPLEX AND DUPLEX SYSTEMS

Type S remote control system installations of many types can be furnished to meet specific traffic requirements, from a Simplex 7-step system with a capacity of 32 control codes, to a Duplex 11-step system providing a maximum of 1,024 control codes.

Already this AEI-GRS system has proved highly successful in many installations, and over transmission distances of up to 200 miles. As in all coded systems, codes are contained in a series of steps, or intervals. However, with the Type S system the use of mechanical oscillators to create the steps ensures that codes are of uniform length and that stepping speeds are always constant irrespective of normal voltage variations. Conventional signal lines can be employed and provision made for voice or telegraphic communication over the same wires if desired.

Each installation has its own individual problems in the solution of which AEI-GRS Engineers are always ready to co-operate and make suitable suggestions.

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AEI-GRS LEADING SIGNALLING PROGRESS

* No. 2 appeared September 8.

DESIGNING

AND MAKING
TRACTION EQUIPMENT

You, as an engineer, know that there can be no sharp dividing line between designing and building. A good design incorporates experience gained in making, testing and commissioning similar equipment in the past. And, of course, it is also shaped by the experience of all sorts of people using the earlier designs under a variety of conditions that could not be simulated in any test laboratory.

To a long-established company such as Crompton Parkinson this process of feedback of information to the designer is fundamental.

In traction equipment, where space and weight must be kept down, and yet robustness and accessibility are at a premium, it shows up in the simplicity and elegance with which these conflicting demands are reconciled. As for example, by the neat cylindrical frame of the latest trolleybus motor. In the design of these motors we were able to make direct use of the experience we had gained with earlier trolleybus motors as well as more indirectly from hundreds of other equipments built for main line locomotives, shunters and motor coaches.

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Traction Division, Chelmsford, Essex.
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Makers of Electric Motors of all kinds, A.C. and D.C. Generators, Switchgear, B.E.T. Transformers, Cables, Instruments, Lamps, Lighting Equipment, Batteries, Stud Welding Equipment, Traction Equipment, Ceiling Fans.

NEWS FROM ALL QUARTERS

Ross By-Pass

The Ross by-pass on the north-west side of Ross-on-Wye was opened to traffic on Saturday, September 3. This dual carriageway road, a mile and a half long, links up with existing roads between South Wales and the Midlands. At the eastern end it will be connected with the Ross Spur motorway, which is to be opened before the end of the year.

Aberdeen-Inverness Diesel Trains

The experimental fast intercity diesel service introduced for the summer between Aberdeen and Inverness on July 1 has been a considerable success. The service is due to end on September 10, but in order to determine if there is a demand for such a service outside the summer months, it has been decided to continue the experiment until the end of the year. Only a relatively small number of users have been residents or local business travellers. It is hoped, however, that the existence of this service during the winter months will attract businessmen and local people.

Importance of U.S. Waterways

The U.S. Army Corps of Engineers, which has operated and maintained the inland waterways system of America since 1824, reports that further improvement and extension of the 20,000 miles of such waterways is merited in view of the expected increase in national freight tonnage to be moved. Substantial reductions in cost of waterway movement can be effected by modernisation of all classes of facilities. The U.S. Senate has just voted some £260 million for general construction on waterway projects for 1960-61. This is about one-third of the sum devoted to the road construction programme.

Crossing Warnings on Rhodesia Railways

Rhodesia Railways is to install five additional sets of flashlight warning signals at main-road level crossings. There will be three in Southern Rhodesia and two in the North and installation will take about two months. Those in Southern Rhodesia will be at Banket, Lions' Den and Hunters Road. In Northern Rhodesia both installations will be on the Kitwe-Chingola road—one near Mindolo Halt and the other near Luano Junction. A special set of four booms for the four-lane road at the Salisbury Highfields level crossing was to leave by passenger ship for Rhodesia at the end of August.

New Lighting for Darlington Station

As part of the North Eastern Region plan to improve station amenities, work is now well advanced at Darlington Bank Top Station on a scheme for the replacement of the existing lighting system—now life expired, by the more efficient and more economic cold cathode lighting, similar to that now in use at both York and Newcastle stations. The new lighting system will consist of fluorescent tubes which will be protected by translucent plastics diffusers from dust. These will also ensure maximum controlled illumination. There will be no risk from falling glass in the event of an accident. The fittings have been manufactured by Eleco, Limited, St. Albans, Ionlite, Limited, London, and Benjamin Electric Co., Limited, London, and the installation work is being carried out by S. H. Heywood and Co., Limited, of Manchester.

Hanger Lane Underpass Partially Open

The northern (i.e. eastbound) carriageway of the Hanger Lane Underpass on Western Avenue, London, was opened to traffic on September 1. The two northern slip roads, forming a surface connection with the North Circular Road for turning traffic, were also brought into use on that date. Complete opening to traffic of this intersection is expected early in October.

Fuel Oil Trains for Steelworks

The new plate mill at Consett of the Consett Iron Co., Limited, receives fuel oil supplies in three trains every week, carrying almost 1,000 tons of heavy fuel oil. The supplies of heavy fuel oil are drawn from the Shell-Mex and B.P. installation at Jarrow 26 miles away. It is carried in 20-ton tank cars and each train consists of 16 cars. Over the heavy gradients between Pelton and Consett—the steepest is 1 in 35—a banking locomotive is employed.

Rickmansworth Road Railway Bridge

Work on the new lattice girder bridge to carry additional Metropolitan Line tracks over a widened Rickmansworth Road between Northwood and Northwood Hills stations is now well in hand. The bridge has a considerable skew, being only 26 deg. off the road alignment and hence the three girders are each 163 ft. in length, that in the centre weighing 170 tons and the two outer girders 110 tons each. The bridge was designed and fabricated before the war by London Transport engineers. The highway is being widened to 60 ft. overall.

Television Camera over Locomotive Wheels

Because of abnormal wear on sharp curves of the track between Umtali and Salisbury, Rhodesia Railways mounted a Marconi closed-circuit television camera on a locomotive so that the action of the wheels could be observed while in motion. The undertaking is also considering using vehicles which can operate on road or rail, and eventually light helicopters for maintenance inspection of the new centralised train control. Centralised train control will be complete throughout the Rhodesia Railways main lines by 1963, except for double track sections and the Lourenço Marques line.

B.T.C. on to a Good Thing

Norfolk County Council has run up against a difficulty in its scheme to utilise sections of the former Midland and Great Northern railway line to form part of a new road between Aylsham and Caister. The valuation of the railway sites by the B.T.C. is £200,000, seven times that placed on them by the council. The Commission contends that this is not simply agricultural land, but that the value of the engineering work which went into the construction of the line must be taken into account. The chairman of Norfolk Highways Committee, Alderman F. Easton, is a member of the East Anglia Area Transport Users Consultative Committee. He is also a road haulier. The Ministry of Transport has given authority for land to be acquired in advance of requirements on five stretches of the line including six miles from Potter Heigham to Stalham.

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We are specialists in the manufacture of precision and standard fasteners for the Motor Industry

NEWALLOY - Wheel Bolts, Wheel Studs.

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Standard bolts and nuts supplied in "R", "T", and "V" quality, and other Alloy Steels.

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Group of typical components, as supplied to the leading motor car manufacturers.

COMMERCIAL AVIATION

B.O.A.C. Training at Shannon

TRANSATLANTIC TRAFFIC

WITH the approval of the Irish authorities, the British Overseas Airways Corporation intends to transfer its Boeing 707 training activities from St. Mawgan R.A.F. Station, Cornwall, to Shannon Airport in mid-October. Mr. Basil Smallpeice, managing director of B.O.A.C., said recently: "The reason is that runway extensions now completed at Shannon have made that airport operationally attractive for the training of flying staff in jet aircraft such as the Boeing 707. In recent months, during which B.O.A.C. has received every consideration from all concerned at St. Mawgan, the Corporation has kept under review the improvements being made at Shannon, where, in addition to the reconstruction and extension of the runway, I.L.S. equipment will be available on the improved runway and normal lighting facilities will be provided shortly. Moreover, runway crosswinds, which can interfere with 707 flights at St. Mawgan, should not be encountered at Shannon. Indeed, in winter weather it would probably have been necessary at times for the 707s to operate from other aerodromes than St. Mawgan. The decision to use St. Mawgan was taken originally because work on the extension of the runway at Shannon was then still being undertaken and it was not known at that time whether the airport there would be available for the type of training we required." B.O.A.C. began 707 training at St. Mawgan on May 23 last. Up to now 86 flying staff (including engineer officers) have been trained there. Altogether, 304 members of flying staff are being trained to operate 707s and the training programme is likely to be completed some six months after the transference to Shannon.

B.O.A.C. 707s to Detroit and Chicago

B.O.A.C. Rolls-Royce powered Boeing 707s will also serve Detroit and Chicago from September 20. There will be two flights a week from London via Glasgow and Montreal. The jet journey time from London to Detroit will be 10½ hr. and to Chicago 12½ hr. Services will leave London and Chicago on Tuesdays and Saturdays. The new 707 flights will be in addition to a once-weekly Britannia.

More Swissair Caravelles to Middle East

From September 11 Swissair will operate Caravelle jet services to another four destinations in the Middle East—Baghdad, Beirut, Damascus and Tehran. The airline already has Caravelle flights to Ankara, Cairo, Istanbul and Tel Aviv. From that date Swissair Caravelles will serve Beirut, Istanbul and Tel Aviv three times weekly, Ankara, Cairo and Tehran twice weekly, and Baghdad and Damascus once weekly.

3,000 Hours for T.C.A. Darts

The Rolls-Royce Dart turbine engines which power Trans-Canada Air Lines Vickers Viscounts have achieved an unprecedented 3,000-hour life between overhauls. It is the first time Dart engines, powering more than 430 Viscounts in service with 53 companies and governments around the world, have reached the 3,000-hour mark—and the first time any commercial aircraft power plant has attained this degree of reliability. The original life between overhauls was 600 hr. This increased steadily through the years. During the last few months it rose in increments of 100 hours every two weeks. During this same five-year period, the unscheduled removal rate has also improved. With a daily utilisation of approximately 8 hr., it takes one year for a T.C.A. Viscount power plant to achieve 3,000 flying hours.

North Atlantic Traffic

As indicated briefly in MODERN TRANSPORT of September 3, over 80 per cent of the passengers who flew the North Atlantic during April, May and June of this year travelled economy class, the International Air Transport Association has reported. Total North Atlantic passenger traffic of I.A.T.A. member airlines in all classes for the second quarter came to 478,751, a 26.8 per cent increase over the same quarter in 1959. Economy class accounted for 387,206 passengers, or 80.9 per cent of this total, first class for 87,172 passengers, or 18.2 per cent and tourist for only 4,373 passengers, or 0.9 per cent; tourist class services ended on June 30. Cargo carryings over the route during the quarter increased 37.9 per cent to 10,659,710 kg. or 23,451,362 lb. There was also an increase in all-cargo services flown during the period, from 614 last year to 802 this year. At the same time, mail carryings increased 15.2 per cent to 3,322,315 kg. (7,309,093 lb.). During the quarter, some 284,000 passengers crossed to Europe as against 194,000-odd who flew to North America. Eastbound load factors reached 90.4 per cent in June, the peak month for travel to Europe. Most westbound aircraft flew at little more than half capacity during the same month. Load factors average 70.9 per cent, an increase of 3.4 per cent over the same quarter last year. While the number of scheduled flights dropped by 6.7 per cent to 7,695, larger aircraft and the greater provision of economy seating allowed the airlines to carry over 100,000 more passengers than in April-June, 1959.

I.A.T.A. Clearing House

An estimated 31 per cent increase in inter-airline business settled through the I.A.T.A. Clearing House in London is reported for the first six months of this year by the International Air Transport Association. Interline charges cleared by this I.A.T.A. service totalled \$659,864,000 (£235,273,000) for the half year as against \$449,078,000 (£159,670,000) for the same period in 1959. The increase for the first six months of 1960 over the corresponding period of 1959 was actually 46.9 per cent but a rearrangement of clearing procedures by two members was partially responsible and affects any comparisons between the 1960 and 1959 clearances both through the I.A.T.A. Clearing House itself and its inter-clearances with Airline Clearing House Inc. (A.C.H.) in the United States. Offsetting eliminated the need for cash settlement of 89.4 per cent of the value of all transactions cleared in the six months under review. In that period there were 23 individual company offsets in the monthly clearances which exceeded 99 per cent, eight of which exceeded 99.8 per cent. In one case, an airline settled accounts totalling almost \$8,000,000 through a single payment of \$72,697. Inter-clearances between the I.A.T.A. Clearing House and A.C.H., which, as mentioned before, were also affected by the rearrangement of procedures, came to \$38,879,000, up 123 per cent from the \$17,470,000 total for the first six months of 1959. I.A.T.A. estimates that the increase in normal inter-clearances was about 19.3 per cent.

EASTERN REGION MANAGEMENT



Mr. A. W. Tait

Mr. A. W. TAIT, M.Inst.T.

• • • • •

An assistant general manager of the Eastern Region of British Railways since 1956 when the new regional organisation was established, Mr. Alexander William Tait became, following the retirement of Mr. A. J. White, the senior of the three assistant general managers who, under the general manager, constitute the senior management level in the region. Joining the Great Western Railway in the chief accountant's office in October, 1926, he had experience in various sections of the office and on the personal staff of the chief accountant. In 1937 he was selected for a year's special training whereafter he was appointed personal clerk to the chief accountant, and during the wartime years of government control he was assistant secretary to the two committees of accountants—one looking after the railway companies' financial interests and the other responsible to the Railway Executive Committee for day-to-day financial administration. Until the nationalisation of the railways he was a financial liaison officer for the companies with the Hays Wharf Cartage group which then comprised Carter Paterson, Pickfords and Thos. Cook. Mr. Tait took part in proceedings before the Railway Rates Tribunal when, in 1946, it was acting as a consultative committee in the hearing of the railway companies' postwar charges application. In 1948 he was one of the railway and road officers who assisted Sir James Milne in his inquiry into Irish transport. In 1950 he joined the headquarters staff of the British Transport Commission and was appointed director of costings in 1951. He promoted the traffic costing service to carry out economic studies into the structure of the traffic and operations of the Commission's railway, road haulage and bus undertakings, studies which were undertaken to assist the Commission in policy decisions on such matters as railway modernisation and charges and rail and road co-ordination. During 1955 and 1956 he gave evidence before the Transport Tribunal during the hearings which resulted in the granting of maximum charging powers, and gave the railways freight charging freedom. While serving at Commission headquarters, Mr. Tait was director of several bus companies in the B.E.T. group and he is now a director of Atlantic Steam Navigation Co. Limited, and of the Humber Graving Dock and Engineering Company. A qualified accountant, he is a member of the Institute of Transport and the author of a recent paper to the Institute on "Railway Fares Structure."

LETTERS TO THE EDITOR

Electric versus Diesel Traction

DISTRICT LINE STOCK

SIR,—Whilst welcoming the first of a series of articles on the present state of railway electrification, published in your issue of August 27, I feel that the broad economic assumptions made by Mr. Haut should be challenged. It is altogether too sweeping to say that diesel traction is "far more costly than electric traction for dense services" and that "main lines are more economically run by electric traction, especially beyond a certain traffic density—that is considered an accepted fact in the whole of Europe." This would suggest that the many European railway administrations, the B.T.C. included, who have chosen to use diesel traction on main lines, are entirely misguided; nor does it explain American practice, which Mr. Haut mentions briefly.

As recently as May 27 this year, the general manager of the Netherlands Railways gave figures which suggested that the cost advantage of electric traction in the Netherlands was marginal, and a similar order of comparison has been shown in cost analyses prepared for the Office for Research and Experiments of the U.I.C. by the Danish, Norwegian, Swedish and Finnish State Railways.

These several examples indicate that only by careful comparative costing can the relative economics of two means of traction be assessed. By no means all main lines are suitable subjects for electrification; much depends on the degree of self-containment of the route, as well as on the density of traffic on the line. In practice the final choice between the rival systems may be based on a product of greater reliability in operation, greater tractive capacity, and of public demand, rather than sheer economics. This, I would venture to suggest, may be the real reason for the electrification in progress in Europe.—Yours faithfully,

J. HOLROYD.

42 Lulworth Drive,
Pinner, Middlesex.

Plea for District Stock

SIR,—I would like to draw your attention to the fact that London Transport intends to scrap shortly five vintage District Line cars, namely Nos. 4118, 4037, 8789, 8902 and 8791. They are Hurst Nelson cars fitted with B.T.H. equipment, 4118 being the motor car built in the year 1913 and the rest being trailers dated 1910-13. They were originally H stock and were last used in 1954 between Earls Court and Olympia. They are fitted with hand-operated doors and heaters are fitted under all seats. They have been parked at Ealing Common depot sidings for the last six years, all fittings, such as seats, being stored.

These five cars are the last link with the pre-1914 period except for the stock train which is used for carrying spares between Ealing Common and Upminster every three months and is of the same year. These coaches have, however, been converted and painted light grey. It is not the intention of London Transport to keep this stock and it is to be scrapped very shortly. One wonders whether there is any museum, such as that of Lord Montagu of Beaulieu, or the Bluebell Railway Preservation Society, or other similar bodies which might perhaps be interested in purchasing these five examples of early Underground trains.—Yours faithfully,

GRAHAM L. PARKER.

Flat 79a
New Broadway,
LONDON, W.5.

The Editor is always glad to receive letters from readers on subjects germane to the transport industry, but these should be written as concisely as possible. The opinions expressed therein must not, however, be regarded as having editorial endorsement. Where correspondents desire to use a nom-de-plume it is essential that the Editor should be informed of the name and full address of the writer as indication of good faith.

DETECTION OF MILL SCALE

Shell Research Finds Simple Method

CORROSION of metals is estimated to cost Britain alone some £600,000,000 a year and among recent developments designed to combat corrosion is one by Shell Research, Limited, at its Thornton research centre, where a quick, simple and inexpensive method of checking the completeness of removal of mill scale from steel plate has been developed. Companies of the Royal Dutch-Shell Group are large users of steel plate, not only in refineries but also in tankers that transport crude oil and refined products. It was in connection with the protection of tankers that this test for the detection of residual mill scale on shot-blasted metal surfaces was developed.

As received from the steel makers, the steel plates are covered with mill scale, or magnetic iron oxide, which in itself is immune to corrosive attack but for two reasons is undesirable; it presents a surface which is not a good base for paint and, if it is scraped off, heavy pitting occurs. Should a break appear in the scale, a gouge or score may develop in the metal. In either case, great difficulty results when paint is eventually applied, for the thickness of one coat of even the best paint is only approximately one thousandth of an inch, and these pits or scratches may be considerably in excess of this.

Discovery on the Spot

Removal of the mill scale is, therefore, an important step in the overall protection of steel, and Thornton metallurgists did a lot of work on the technique of shot blasting for this purpose. But some method was needed for measuring on the spot the effectiveness of the shot blasting, for such variables as speed of passing the steel through the blasting process, thickness and hardness of the scale and degree of deterioration of the shot affect the degree of removal. A surface that might appear clean to the eye might still be covered with enough residual scale to reduce the protection offered by the paint.

The method devised by Thornton for overcoming this problem requires only the application of a solution of copper sulphate to the freshly blasted steel surface. Areas entirely free of mill scale become coated with copper, while any scale shows up as a dark area against the copper background. The whole operation takes only a few seconds, it needs no more equipment than an impregnated pad or sponge, it can be interpreted by the man on the job and its cost is low.

The brilliant new Cab ahead of engine...14

Here is the biggest truck news in years. A completely new range of forward control Bedfords destined to be leaders right from the start. The TK Bedfords introduce an inspired new approach to forward control! Cab *ahead* of engine. All the advantages of forward control with none of the drawbacks. Ideal weight distribution; maximum body length in relation to wheelbase; better manoeuvrability; excellent all-round vision; wonderful *forward* vision.

The easy-entry TK cab has a flat, walk-through floor and more than enough room for a crew of three. The engine, mounted in the upright position, is in a separate compartment. It is easily reached through hinged side flaps. Accessibility is outstanding.

There are 14 different TK chassis: 3 ton to 7½ ton trucks; 6 cu. yd. tippers; 8 ton to 12 ton artics; plus the famous TJ range of normal control Bedfords from 25 cwt to 8 tons.

Get in touch with your Bedford dealer now, and ask him to arrange a demonstration of these latest and greatest Bedfords.

Rugged, full length flat-topped frame.

Improved rear axles, 13,000 lb. and 18,000 lb. capacity. New rear springs.

One-piece backlight, rear quarter-lights. No-draught ventilation panes.

New extra powerful fade-free braking.

Square blank disc wheels, with 16 inch wheels 3 to 5 tonners, 20 inch for heavier models, 17 inch option for 6 tonners.

New power servo—Air assisted diesel, Vacuum assisted petrol models.

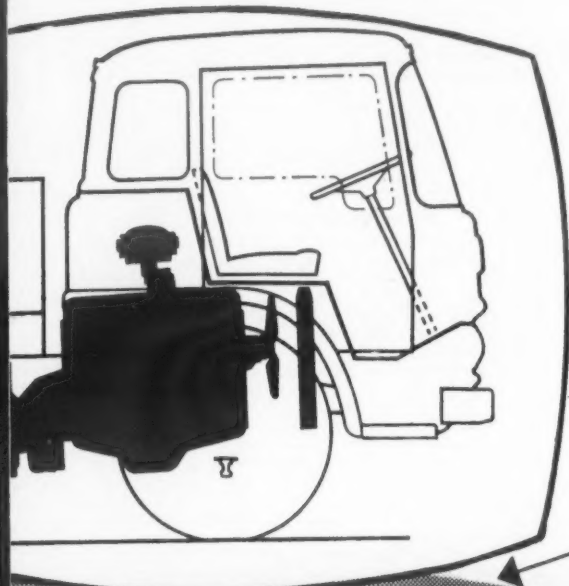
Vauxhall Motors Ltd., Luton, Beds.

PROVED BY FOUR YEARS OF WORLD

BEDFORD



chassis - 3 to 12 ton range



The TK engine is housed in an entirely separate compartment. No fumes, no noise, no heat.

Low overall height.



One piece windscreen, extra wide, extra deep.

Low windscreen line. Driver sees road surface within 7½ feet of bumper.

Wipers sweep overlapping arcs. 7 sq. ft. wiped area.

Improved front axles. Longer and wider front springs. Larger diameter shock absorbers.

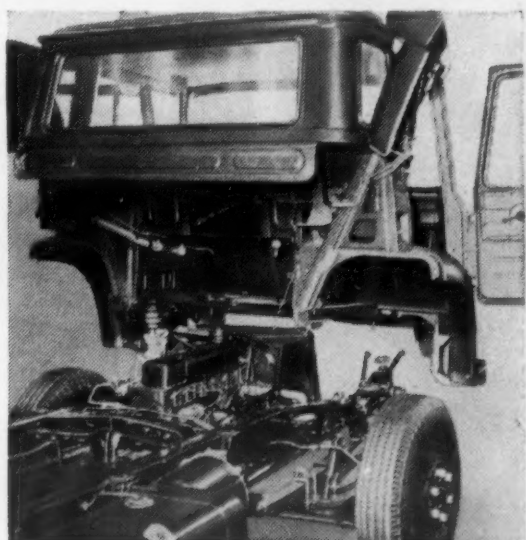
Low step height, low door sills, flat walk-through floor, wide cab doors, wide-angle opening.



Superb comfort for the driver. Room for three. The flat, walk-through floor gives equal leg room for all.



Easy access to the full length of the engine from either side through hinged flaps.



For major overhauls the entire cab can be removed in 30 minutes.

-WIDE TOUGH TESTING

New Leylands

(Continued from page 5)

The super-low train is arranged at the input end of the gearbox and is therefore effective on all other gears as a range changer. It is not intended normally to be used in this manner and a separate lever is provided for engagement of extra-low. It does, however, give a useful additional low reverse gear of 8.36 to 1. Two power-take-off drives can be taken off the gearbox at the same time, one providing 20 h.p. and the other full engine torque.

The design permits use of an extra large driving pinion—normally the weakest component in an axle—which drives a rigidly supported crown-wheel and strong differential unit. In the hubs a second reduction is provided by epicyclic gears, combining a sun wheel splined on the axle shaft and five planet wheels that rotate in a fixed annulus to transmit the drive to the hubs at a ratio of 3.46 to 1. Axle shafts are thus lightly

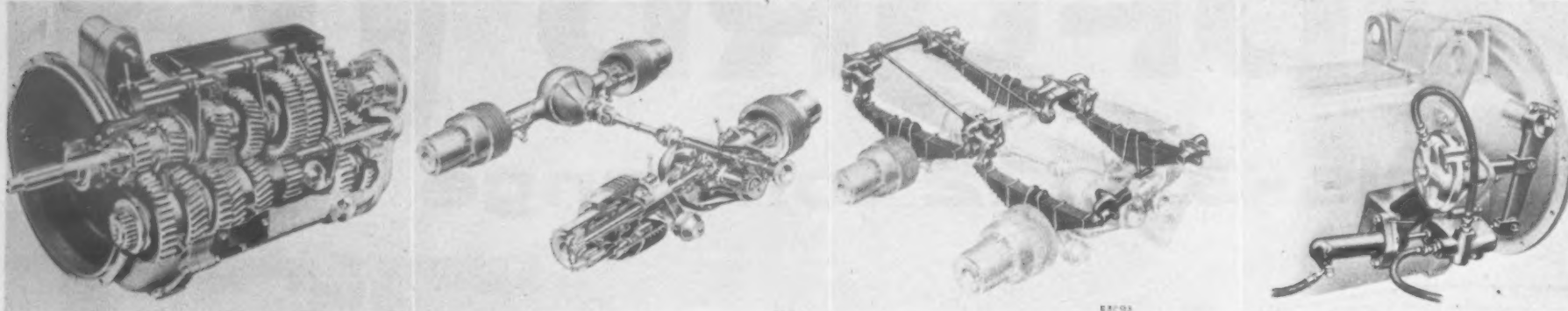
transmits the drive to the rear axle. The third differential can be locked by an air-operated mechanism controlled from the cab. Overall ratios are the same as those available on the single axle.

The second axle on the bogies can be replaced by a trailing axle if required. This is a completely interchangeable unit and utilises the same torque reaction tubes, brake cylinder mountings and spring attachments as a driven axle. This reduces the weight of the vehicle by 7 cwt. It is recommended that single drive is used only for solo work over suitable road surfaces and gradients.

Two alternative forms of bogie suspension are available—a non-reactive bellcrank lever system specially developed for high-speed trunk road

With the other suspension system, the springs are inverted and secured at their centres to trunnion bearing housings by inclined U bolts, which pass over semi-circular clamping pads on top of the spring assemblies. The patented trunnion bearing incorporates a rubber bush which requires no lubrication. This suspension has been improved by allowing the outer ends of the springs to remain free to rest on the hanger brackets. Torque reaction tubes stabilise the axles when operating over rough country.

The two front axles on the Octopus and the single front axles on the Beaver and Hippo, each designed for 5 tons, are I-section alloy-steel forgings. The vertical load is carried centrally on



New heavy-duty range components: five-speed constant-mesh gearbox with built-in super-low gear at input end and overdrive at output end; double-drive arrangement of double-reduction (bevel-epicyclic) axles of Hippo and Octopus; lightweight bellcrank bogie suspension; and the air servo for hydraulic clutch mechanism fitted with 200-h.p. engines

Under certain circumstances, they can be operated while the vehicle is moving.

Double-Reduction Axles

From the gearbox, the drive is continued by open tubular propeller shafts of Hardy Spicer 1700 type with needle-roller-bearing universal joints—in the case of the four-wheel Beaver to a new Leyland heavy-duty 9-ton single-speed axle with additional reduction in the hubs. The axle is a much heavier version of the double-reduction unit already proved over millions of miles of tests and actual service conditions in other Leyland Group vehicles.

stressed, the torque applied to them being three to four times lighter than in a conventional axle. Overall ratios available are 7.74, 6.06 or 4.82 to 1.

On Hippo and Octopus double-drive chassis, the two rear driving axles are of similar design and construction, with the exception of the differential housing of the leading axle, which is enlarged to incorporate the through drive for the rearmost axle. The input shaft drives the spiral bevel gearing of the leading axle through a helical gear train and continues above the bevel gears through a third differential to an output shaft at the rear of the casing. A universally-jointed propeller shaft

operation and a trunnion-mounted system which has been used with complete success on Leyland vehicles under tough conditions over a period of 12 years and has now been improved further. The new bellcrank suspension is of low-weight construction, in which each axle is mounted on two semi-elliptic springs anchored at their front ends to the frame. The rear of the springs are attached to bellcrank levers connected by tie rods arranged to distribute the load and braking equally between the two axles. Brake torque is fully compensated to prevent the leading axle lifting during severe brake application.

a single hardened steel button at the base of the parallel king pins. Wheel hubs are mounted on taper-roller bearings and are provided with efficient oil slingers and seals. Hydraulic telescopic shock absorbers are standard at the front.

Power Steering Standard

Power-assisted steering which allows the feel of the wheel is fitted as standard on all models. A hydraulic servo operates on the draglink on single front axles and on the relay drop arm between the two steering axles of the Octopus. When the steering gear is operated without hydraulic pressure, a control valve built into the steering box allows complete freedom of movement by permitting free circulation of the oil in the booster system.

The steering box itself is of Leyland design, but incorporates Marles cam-and-double-roller gear. The rolling action of the mechanism reduces friction to a minimum and the whole unit is adjustable, enabling wear to be corrected. The twin-spoke steering wheel is 21 in. in diameter. With a ratio of 28.5 to 1, only 4½ turns of the steering wheel are required to move the road wheels from lock to lock.

All chassis in the range have air-pressure brakes of a similar pattern to those fitted on the Leyland underfloor-engined passenger chassis and on the Super Comet. The system is pressurised to 100 p.s.i. by an engine-driven 10-cu. ft. twin-cylinder compressor feeding main and auxiliary reservoirs. The auxiliary unit supplies air for assisting handbrake and clutch operation as well as for the locking mechanism on the third differential on the multi-wheeled models. A progressive Bendix-Westinghouse D1 valve and slack adjusters and direct-acting diaphragm brake chambers are used in conjunction with S-profile cams. Brakes are fitted to only three axles of the Octopus.

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Front grille and radiator block removed showing rubber sealing ring on non-recirculatory radiator cowl

Standard on all chassis is a power-assisted handbrake. The brake has been designed with a lever ratio of 280 to 1, so that even without power assistance an effective brake is still available through mechanical linkage.

Tubular Crossmembers

The frame arrangement departs from the type previously used on Leyland heavy-duty vehicles in that more tubular crossmembers are used. Frame stresses are also reduced by locating crossmembers with the spring hanger brackets. Spring brackets and crossmembers are bolted to the sidemembers. Four-wheeled chassis have 9½-in. deep frames, strengthened in the case of tippers by the addition of fitchplates. Lightweight multi-wheelers have 11½-in. deep frames, while the heavier types have a frame depth of 12 in. The heavy-duty front bumpers fitted as standard equipment are carried on substantial brackets that extend from the front of the sidemembers. All chassis conform to the international frame width of 34 in.

An extremely strong fuel tank, made from two seam-welded steel pressings, is secured to the frame sidemember on metal straps. Tank capacity on haulage types is 48 gal. (218 litres) and 36 gal. (164 litres) on tippers and tractors.

Detachable steel disc vented wheels are fitted, single at the front and twin at the rear, secured by ten ½-in. studs. Tyres are 10.00-20 14-ply on the home market and 11.00-20 12-ply on export-market Beavers and Hippos and 9.00-20 12-ply on the Octopus.

(To be continued)

BEDFORD TK RANGE

Forward Control Without Tears

TRANSMISSION HANDBRAKES AND
MORE SMALL WHEELS

LOGICAL evolution, with just the right amount of boldness and inspiration to synthesise it into a positive and patent advance, perhaps best describes what Vauxhall Motors, Limited, has achieved with the new Bedford TK forward-control range of goods vehicles announced this week. Attempts by other British manufacturers have gone part of the way towards providing the advantages of forward

The Bedford TK range includes dropside lorries, tippers and articulated tractors and covers 13 different basic types from 3 tons to 12 tons payload rating, as shown in the table on page 16. There are eight lorries for from 3 to 7½ tons payload, two tippers for 6 cu. yd. bodies and three tractors for semi-trailer payloads of 8, 10 and 12 tons. With all but the 12-ton articulator there is a choice of petrol or diesel engine and most chassis



Outward and visible features of the new Bedford TK range are well shown in this picture of a 5-tonner, which now runs on 16-in. wheels

control while eliminating its disadvantages; the new Bedford, we think, goes all the way. The basis of the evolution has been a redistribution of the engine rearwards and of the seats forwards, providing at once full-width seating and step-in walk-through cab access, generally on a par with normal-control accessibility, plus a depth of windscreen, and therefore forward vision, unrestricted by bonnet or engine cowl.

Better Accessibility

Far from finding it necessary to bury the engine further in order to achieve this, the Bedford design uses a standard vertical engine in a



A picture illustrating how well the TK cab lends itself to integration with van bodywork. This experimental example is on a 4-ton chassis

separate compartment at the back of the cab, with lift-up traps on each side of the cab providing excellent access without contortion. In fact, engine accessibility is better than in most bonneted designs, the driver or mechanic being able to get in behind the front wheel and stand up to the job. The full length of the engine is accessible from each side, making routine servicing, even up to cylinder head removal, simple. The jack, starting handle and other tools are also housed in this compartment. Only natural lighting is deficient and to compensate for this two electric lights are fitted in the top of the engine compartment. For major attention, the

tyres are fitted. The cab is of welded pressed-steel construction, with double-skin insulated roof and a ventilator in the centre of the foot panel as an air intake for the optional heater-demister. The deep curved one-piece windscreen gives a view of the road surface within 7 ft. of the front of the vehicle from the eye level of a normal driver and twin wiper blades with overlapping arcs sweep a screen area of 7 sq. ft. There is a wide rear window and quarter lights over the engine compartment behind the doors.


Wide doors have winding full-drop windows and swivelling glasses at the forward end, with an adjustable mirror on each side. A full-width front



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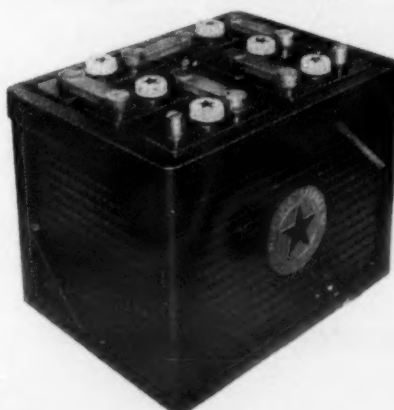
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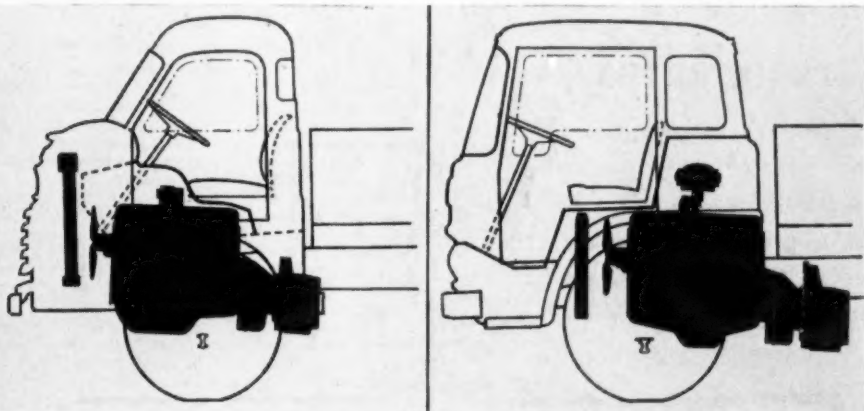


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Diagrammatic illustration of the differences in engine and seating disposition in the superseded and (right) TK chassis

whole cab is designed for easy removal, an operation said to take only about 30 min.

Incidental benefits of the new layout are reduced front-axle loading—static steering effort required fully loaded is said to be 25 to 30 per cent less than on S-type Bedfords—and very low level of noise in the cab. Other notable features in the design are the adoption of transmission handbrakes throughout the range and extension of the use of small-diameter wheels to bigger load carriers, namely 16-in. equipment up to 5 tons capacity and optional 17-in. on the six-tonner. Applied to 4-ton capacity vehicles in the old range, 16-in. wheels and tyres have given improved stability and, it is claimed, have cut tyre costs by as much as a third.

bumper is standard. The front wings are made in two parts, the front part is bolted to the cab structure and the rear part is easily removable to increase engine access when necessary. Normal equipment for the home market provides two seats, the driver's being adjustable for reach; a two-man passenger seat to international standard is fitted to export vehicles and is available optionally at home. By moving the engine out of the cab, positioning of the controls has been dictated solely by the greatest convenience for the driver. A short gearlever is set at a comfortable height to the left of the driver's seat and the handbrake lever, with a ring guard over the ratchet-release knob, is placed on the right. Light switches, horn

(Continued on page 16)

Bedford TK Range

(Continued from page 15)

button and self-cancelling switch for flashing indicators, which are standard on all load carriers and optional on tractors, are just below the steering wheel and a hooded instrument panel is directly ahead of the driver.

With the bulk of the engine weight behind the

dia. dampers compared with earlier 1-in. units. Engine specifications are basically unchanged from the earlier range, which includes Bedford 214- and 300-cu. in. petrol and 200- and 300-cu. in. diesel units and the Leyland O350 diesel. Minor changes for the TK range include a new clutch

engines. All diesel engines have a new single-cylinder air compressor and all Bedford engines have new wedge-type fan-generator belt drive and modified water outlets, while the petrol engines have a generator with higher output at low speeds.

THE NEW BEDFORD TK RANGE

Model	Maximum G.V.W.	Wheelbase	Body Length	Road Wheels
3 ton KC	12,500 lb. 111½ cwt.	135 in.	14 ft.	16 in.
4 ton KC	15,000 lb. 134 cwt.	135 in.	14 ft.	16 in.
5 ton KDS	18,000 lb. 160½ cwt.	135 in.	14 ft.	16 in.
5 ton KDL	18,000 lb. 160½ cwt.	151 in.	16 ft.	16 in.
6 ton KE	20,500 lb. 183 cwt.	151 in.	16 ft.	17 in. or 20 in.
7 ton KFS	23,000 lb. 205½ cwt.	151 in.	16 ft.	20 in.
7 ton KFL	23,000 lb. 205½ cwt.	167 in.	18 ft.	20 in.
7½ ton KG	25,000 lb. 223½ cwt.	167 in.	18 ft.	20 in.
7 ton KFT	23,000 lb. 205½ cwt.	120 in.	capacity 6 cu. yd.	20 in.
7½ ton KGT	25,000 lb. 223½ cwt.	120 in.	capacity 6 cu. yd.	20 in.
8 ton KEA	Max. G.C.W. 27,000 lb. 241 cwt.	96 in.	25 ft. Max.	20 in.
10 ton KFA	33,600 lb. 300 cwt.	96 in.	25 ft. Max.	20 in.
12 ton KGA	38,500 lb. 343½ cwt.	96 in.	25 ft. Max.	20 in.

The new engine position has made minor modifications necessary to sumps and some auxiliaries.

The 13,000-lb. single-speed spiral-bevel rear axle fitted on chassis up to 5 tons capacity is based on the unit already fitted to the 4-ton normal-control Bedford, a heavier load rating having been achieved by use of increased tube thickness and new bearings throughout. The 17,000-lb. hypoid axle on 6- and 7-ton vehicles is as previously fitted and a strengthened version rated at 18,000 lb. is used in long-wheelbase

7½-tonners. The 18,000-lb. Bedford two-speed axle, which is standard on the 12-ton tractor and available optionally on six-tonners and upwards, is also as previously used, except that the standard arrangement on diesel-engined vehicles will be air-pressure instead of vacuum change-speed actuation.

New Brake Design

One of the greatest changes in the TK range from the earlier S range is in brake design, which is aimed at achieving higher brake efficiency for lower pedal pressures and the elimination of brake fade. Most fundamental is the adoption of a transmission handbrake throughout the range. The transmission brake, of the disc type on 7½-ton lorries and 10- and 12-ton tractors and a drum brake on all other chassis, is fitted immediately behind the gearbox. The chief advantage of a transmission brake is, of course, that it starts from cold in an emergency—an emergency that might have arisen through partial fading of the wheel brakes, when a conventional handbrake is practically useless. Further resistance to brake fade is provided by a drum thickness increased by 66 per cent at the front and 36 per cent at the rear compared with S-type standards, and by adoption of a 50-50 ratio between front and rear brakes.

The actuation system adopted is assisted hydraulic, air-pressure servos now being standard on all diesel-engined chassis and vacuum servos on petrol-engined chassis, with vacuum-hydraulic available optionally on diesel-engined tractors where these are worked with vacuum-braked semi-trailers. Safeguards against brake-actuation failure include a direct mechanical linkage between the pedal and the hydraulic system, so that the brakes are still operative in the event of a servo



Excellent engine accessibility from either side with doors in the cab sides raised; there are two electric lamps over the engine and the rear sections of the front wings are quickly detachable

failure, and use of a tandem master cylinder isolating front and rear brakes in the event of a hydraulic leak in either circuit.

Company tests with the new system indicate a reduced pedal effort, by 30 per cent with vacuum and by 50 per cent with air, for a given brake performance compared with S-type vehicles. Reservoir capacity is said to provide three full servo applications after the engine has stopped, while the transmission handbrake has been found to give three consecutive fully loaded stops from full speed before brake overheating starts to affect performance.

Low Prices Maintained

Examples from the price list of the TK Bedfords show that the cost of the new cab is £100 only. A petrol-engined 3-ton chassis-cowl costs £706, a chassis-cab costs £806 and a complete dropside lorry costs £916, while diesel-engined equivalents cost £120 more in each case. From the middle of the range, the petrol-engined long-wheelbase 5-tonner costs £995 complete, or £1,180 with the six-cylinder Bedford diesel. A diesel-engined 7-ton 16-ft. dropside lorry costs £1,310, while an O350-engined 7½-tonner with 18-ft. dropside body costs £1,673.

Since its inception, the forward-control Bedford range has become a best seller in many of the world's markets, but in various markets operators and drivers have shown strong resistance to the normal forward-control type of cab, which partly buries the engine, making day-to-day maintenance more difficult, and necessitates a steep climb over the front wheels for the crew. Many European operators have in the past bought British popular makes of chassis for their intrinsic incomparable value for money, having them fitted locally with hand-made but more rational cabs, often at an extra cost equivalent of £600 to £800, compared with £100 or so for the standard cab. The well-considered design of the TK range is not only likely to be more acceptable to established Bedford customers; we predict that it is going to add to their numbers manifold.

Bedford Light Van Changes

A number of changes has been announced for the Bedford light vans appearing at the exhibition. Payload capacity of all four variants has been increased by 200 lb., while adoption of 13-in. dia. wheels has resulted in a lower floor line (23½ in.) and flat-topped wheel boxes. Transmission flexibility is improved by lower indirect gear ratios and a range of three final-drive ratios. The standard axle ratio is now 4.625 to 1, with 5.286 to 1 or 4.111 to 1 available optionally. The engine, in common with the latest development for the Victor car, has larger steel-backed big-end bearings, giving a greater reserve for sustained high-speed driving.

Other changes include refinement of the steering relay system and a modified final-drive pinion angle. The starter switch between the seats is no longer used, having been replaced by a combined ignition-starter switch in a redesigned instrument panel, which also incorporates instruments with clearer markings and rheostat-controlled lighting. Short and long versions of both 10-12 and 15-cwt. vans are retained, the short vans costing £450 and £460 and the long vehicles £470 and £480 respectively.

An addition to the established normal-control range is a lightweight dropside lorry on 25-cwt. and 35-cwt. chassis. The 9-ft. long hardwood body, with fixed headboards and detachable sideboards, tailboard and rear corner posts, is made by Hawsons, Limited. Bolster rails and a tilt frame and cover are available optionally.

The London office of Robert Kearsley and Company, manufacturer of paints, varnishes and cellulose lacquers and a unit in the Pinchin Johnson and Associates, Limited, group of companies, has moved from New Cavendish Street to Walkden House, Melton Street, London, N.W.1. (Tel. EUSton 6833.)



Smart lines of the TK tipper for 7- or 7½-ton payload; right, view into the new cab showing wide shelf behind seats, short sturdy gear lever and righthand handbrake. A two-passenger seat is available optionally



front axle, exceptionally good weight distribution for a forward-control design has been achieved, while front-axle loading is reduced, giving lighter steering and improved riding, particularly when empty. Fully laden weight distribution is about 30 per cent front and 70 per cent rear. Riding is also improved by use of wider and longer front springs than on earlier designs and of 1½-in.

housing on all engines to suit new engine mountings and a new radiator with remote header tank positioned in the engine compartment. Engine mountings comprise a single slab-type front unit and new double swinging-link units carried in bonded steel-rubber bushes attached to the clutch housing at the rear. A torque reaction rod is also fitted with the 300-cu. in.



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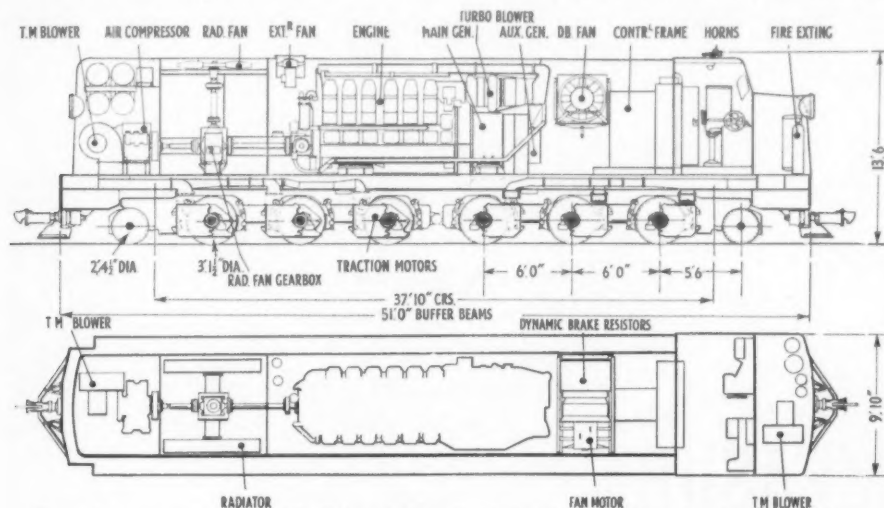
ALTHOUGH predominantly a steam-operated system, the East African Railways and Harbours Administration has in recent years conducted extensive trials with diesel units as a possible alternative form of motive power. The 4,000 miles of metre-gauge railway owned by the administration presents many operating difficulties; the Kenya and Uganda line in particular is a serious challenge to any form of traction.

Over a distance of something like 500 miles it rises from sea level to an altitude of 9,136 feet and involves a temperature range of 35 to 100 deg. F. in conditions that vary from tropical rain to dry heat and dust storms. From Mombasa to Kasese the line has a total length of 1,080 miles. On the

motors, and has a guiding pony truck attached by means of the main bolster pivot and two radial links.

Performance

The diesel engine is an English Electric type 12CSVT four-stroke pressure-charged 12-cylinder after-cooled unit with a continuous rating of 1,875 b.h.p. at 850 r.p.m. Site ratings are 1,840 h.p. up to 5,500 ft., 1,800 h.p. up to 7,800 ft., and 1,775 h.p. up to 9,136 ft. This high output is maintained by turbo-blowers in conjunction with a suitably designed charge-cooling system. There is a calibrated adjustment on the engine which enables the locomotives to be set to the correct site



General arrangement of the 1Co-Co1 main-line diesel-electric locomotives for the East African Railways

main line, which extends to Kampala, a distance of 871 miles from the coast, the gradients do not as a rule exceed 1 in 67, but on branch lines where axle loads are generally limited to 13 tons the gradients are frequently 2.2 per cent, or 1 in 45.

Equal to the Conditions

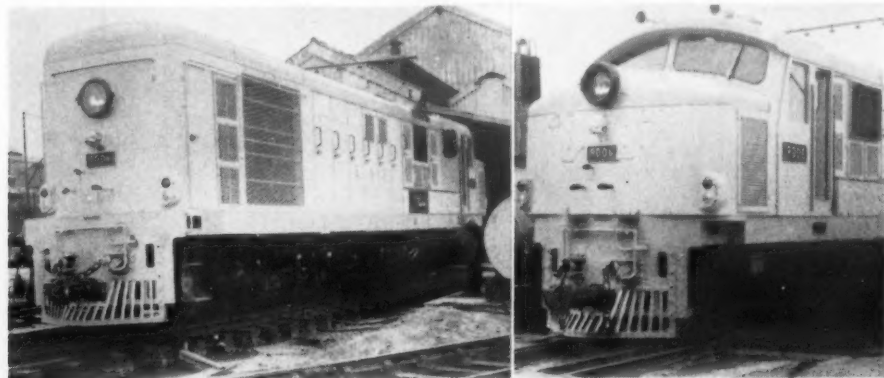
Despite the difficulties imposed by these conditions the trial investigations indicated that a suitably designed main-line diesel-electric locomotive would prove equal to the severe operating conditions. As a result tenders were called for, and it was decided to place an initial order for 10 locomotives with the English Electric group. These locomotives are at present under construction at the Darlington works of Robert Stephenson and Hawthorns, and will shortly enter service on the Nairobi—Nakuru section, where the altitude reaches almost 8,000 feet above sea level. One stipulation specified by the operator was that the locomotives had to be convertible to the 3 ft. 6 in. gauge, and another was that whilst the present stock is air-braked, provision should be made for vacuum-braked stock in a manner that would allow both stocks to be worked for an interim period. These clauses provide for eventual connection with the railways of Southern Africa with free interchange of stock. Basically the new design is that of a powerful locomotive with a light axle loading

output for the line section over which they will operate.

Dynamic braking has been incorporated to make effective use of the long down gradients. In this instance the capacity of the brake is fully able to control a trailing load of 700 tons on a falling grade of 1 in 67 at any speed between 14 and 25 m.p.h. without recourse to the Westinghouse air brakes. The maximum starting tractive effort is 57,000 lb., falling to 50,000 lb. at 10 m.p.h., 25,000 lb. at 20 m.p.h. and 15,000 lb. at 35 m.p.h. With 20.6 tons on the guiding axles there is a total of 76.8 tons available for adhesion, which, in conjunction with a continuous rated tractive effort of 45,000 lb., is virtually the limiting factor of the hauling capacity.

Bogie Design

The bogies are basically similar to those that were fitted with such excellent results to the Rhodesian Railways 2,000 h.p. locomotives. The main frame is a one-piece steel casting supplied by the Belgian firm of Usines Emile Henricot, and fitted with outside axlebox guides and journals. Support for the superstructure is given at three points on each main bogie frame with the pivot centre in a forward position that gives a correct distribution of forces and determines that the position of the drawgear on curves is within desirable



English Electric diesel-electric locomotive for E.A.R. and H. outside the test shops at Darlington of Robert Stephenson and Hawthorns

of 12.8 tons, and able to exert a continuous tractive effort of 45,000 lb. at 10.5 m.p.h. It is therefore suitable for main- and branch-line duties on either freight or mixed workings, and when used in tandem can tackle the heaviest trains of up to 1,500 tons over the 1.5 per cent (1 in 66) gradients at between 15 and 20 m.p.h.

General Arrangement

The locomotive has a 1Co-Co1 wheel arrangement and a weight of 97.5 tons in working order. The superstructure is mounted on two traction bogies and is of the narrow hood type with a full-width driving cab towards one end; a short low-nosed bonnet houses some of the auxiliary equipment. The locomotive is normally driven cab first and has duplicate controls with the second driving position arranged to facilitate hood-first running. The hood superstructure is divided into three compartments; the first (nearest the cab) houses the main control equipment frame, the dynamic brake unit and the engine-generator set; the second contains the radiator panels, fan and associated fan gearbox and shafts; the third covers one of the two traction motor blowers, the mechanically driven compressor and the main air reservoirs.

The underframe consists of two box fabrications which form the main longitudinals, braced by crossmembers. Being hollow, the longitudinal members provide a convenient fuel tank throughout the central part of their length, and hollow cross members have been utilised to form balance connections between the left- and right-hand sides. The underframes supporting the superstructure are carried on three point supports on each of the three-axle bogies. Each bogie is driven by three four-pole axle-hung nose-suspended traction

limits and that the superstructure is properly guided.

Use of relatively soft spring-loaded side bearers in conjunction with the resilient pivot centre forms the three-point suspension and ensures equal loading under varying track conditions. The use of resilience under the pivot centre together with springs in the side bearers also provides a measure of insulation between the bogie and the superstructure which is valuable against high-frequency vibrations set up by corrugated rails.

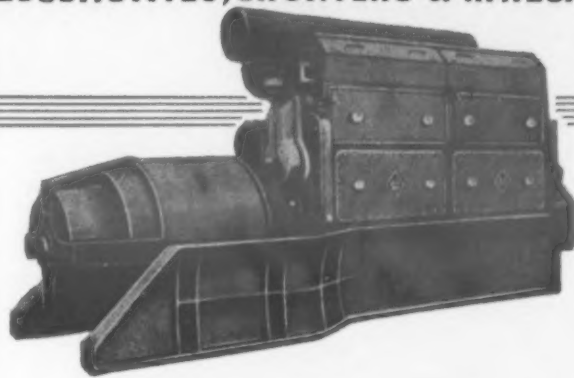
A spring side control device fitted laterally between the two bogies and set to a predetermined value positions the trucks so that they ride at the least possible angle of attack on curves. Track tests have shown that rail stresses due to lateral forces and flange wear are appreciably reduced by this centralising action. The locomotives are being shipped from this country to Mombasa in works grey. They will then proceed to Nairobi and receive the standard maroon livery of the East African Railways before going into service.

The Associated Electrical Industries Midland regional office in Birmingham has moved from its addresses in John Bright Street and Hospital Street to Gloucester House, 65 Smallbrook, Ringway, Birmingham, 5. Telephone numbers are Midland 6335 and Midland 9551.

A new laboratory instructional set now being produced by F. Perkins, Limited, based on the Perkins Mars gas turbine demonstrates the general principles of gas turbines. Education authorities have expressed interest in the set and a number of orders for it has been received by the Peterborough company.

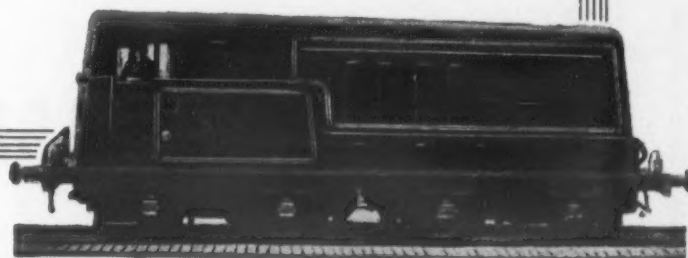
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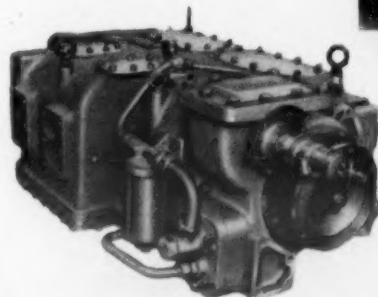
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armourer now?*



THE STEEL COMPANY OF WALES LIMITED

Railway Electrification

(Continued from page 9)

the third one being completed in 1948. All the three differ considerably as experience was gained. Based on these experimental types, a batch of Bo-Bo locomotives was built for operating freight and passenger trains on the third-rail Kent Coast electrification. There will be 24 in all.

Freight trains to be operated will, in many cases, be loose coupled, and such trains have to pick up vehicles in sidings and yards where third-rail electrification would be impracticable. In such sidings, overhead lines are used, and the locomotives are therefore equipped with pantographs as well as pick-up shoes. The locomotives also haul fast freight trains for Continental train-ferry services, and express passenger trains, such as the heavy *Night Ferry* train. The Bo-Bo locomotives have 2,500-h.p. output (at one-hour rating) with four bogie-suspended traction motors, driving through 22 to 76 reduction gearing and Brown-Boveri spring drives. A maximum speed of 90 m.p.h. is possible, and the locomotives are capable of hauling freight trains of up to 900 tons.

Contrast

The method of booster control used in the experimental Co-Co locomotives has been further developed in these locomotives, but there is only one booster motor generator set instead of two. The differences between the Bo-Bo and the earlier Co-Co design show the progress of electric locomotive design during the last decade; this is specially shown by the power/weight ratio of the two types. The earlier Co-Co gave 1,470 h.p. for 105 tons weight in working order, while the new Bo-Bo supplies 2,352 h.p. for only 77 tons. The locomotive follows latest practices in having fully sprung motors and Brown-Boveri flexible disc drive. The electrical equipment was supplied by English Electric and the mechanical parts were built at Doncaster.

B.T.C. Policy Change

In 1958 the British Transport Commission announced its future policy towards electrification. The standard is to be 50-cycle, single-phase a.c. traction instead of the 1,500-volt d.c. system to which Great Britain was hitherto committed. It is the intention to use the new system either at 25,000 or 6,250 volts on most of the new electrifications other than those on the Southern Region and London Transport. The lines originally involved in the a.c. scheme are:

- (i) Euston to Birmingham, Crewe, Liverpool and Manchester.
- (ii) Kings Cross to Doncaster, Leeds and (possibly) York.
- (iii) Liverpool Street to Ipswich, including Clacton, Harwich, and Felixstowe branches.
- (iv) Suburban electrifications, including:
 - (a) The London, Tilbury and Southend line.
 - (b) Liverpool Street to Enfield and Chingford.
 - (c) Liverpool Street to Hertford and Bishops Cleeve.
 - (d) Kings Cross and Moorgate to Hitchin and Letchworth, including the Hertford loop.
 - (e) Glasgow suburban lines.

Under reappraisal (i) has been accelerated and (ii) has been deferred until after 1964; both curtailments and extensions of other main-line schemes are possible. The Crewe-Manchester section and the Colchester-Clacton-Walton lines have been used as pilot schemes and training grounds for the personnel required in large numbers when the whole scheme is completed.

There are 1,796 miles of track in the Southern Region which are already electrified on the 660-volt d.c. system. To alter this to single-phase a.c. would be wastefully expensive and would seriously delay extension of the electrification in this region; the 250 miles of extensions, including all the main lines in Kent, will, therefore, be carried out on the existing third-rail system. The voltage on all the Southern Region electrified lines will, however, be raised to 750 volts d.c. for the existing and future schemes.

British Railways placed the following orders:

A.C. MAIN LINE LOCOMOTIVES

Type of locomotive and builder	No. of locos.	Locomotive Nos. allocated
British Thomson-Houston Co., Limited	Type A	23 E.3001-E.3023
English Electric Co., Limited	Type A	12 E.3024-E.3035
General Electric Co., Limited	Type A	10 E.3036-E.3045
Metropolitan Vickers Electrical Co., Limited	Type A	10 E.3046-E.3055
British Railways Works (Doncaster)	Type A	20* E.3056-E.3075
British Railways Works (Crewe)	Type A	20* E.3076-E.3095
British Thomson-Houston Co., Limited	Type B	2 E.3301-E.3302
English Electric Co., Limited	Type B	3 E.3303-E.3305
	Total	100

D.C. MAIN LINE LOCOMOTIVES

British Railways Works (Doncaster)	24† E.5000-E.5023
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The locomotives have been fully described recently; it suffices to mention their main particulars. The a.c. locomotives are designed for operation under 25,000-volt single phase of 50 cycles frequency but can also operate under 6,250 volts. Leading dimensions are tabulated:

Wheel arrangement	Bo-Bo
Maximum speed	100 m.p.h.
Output (continuous)	3,300 h.p.
Maximum tractive effort	50,000 lb.
Tractive effort (cont.)	21,000 lb. at 54 m.p.h.
Weight in working order	76.5 tons
Length over buffers	53 ft. 6 in.
Bogie wheelbase	10 ft.
Distance between bogie centres	29 ft. 6 in.
Wheel diameter	48 in.

*=Electrical equipment by B.T.H.
†=Electrical equipment by English Electric.

While the railways in Great Britain showed only limited interest in locomotive-hauled electric trains, the opposite was the case with motor-coach traction. The Southern Railway electrification of its lines radiating south of London proved a great success and is still the largest suburban service in the world. Other important electrification schemes were developed such as the Tyneside system and several important lines radiating from Manchester and Liverpool, as well as the L.N.E.R. line from Liverpool Street to Shenfield, later extended to Chelmsford and Southend Victoria. The further plans of British Railways have already been discussed.

Multiple-Unit Operation

Two examples of recent British practice are given, the multiple-unit stock for Liverpool Street-Shenfield and the stock for the Scottish 50-cycle a.c. scheme. In 1936, the former L.N.E.R. began work on the former Great Eastern main line from Liverpool Street to the fringe of the suburban area but the war in 1939 interrupted the work and it was only resumed in 1946 and completed in 1949. A stock of 92 three-coach trains was built; each consisted of motor coach, non-driving trailer, and driving trailer. The coach bodies and underframes are of welded and riveted all-steel construction, the underframe being of rolled-steel section. The three-coach units are operated in multiple-units as six- or nine-coach trains as required. The frequency and running speed of passenger services on the Liverpool Street-Shenfield line has been considerably improved since the line was electrified. Speeds have been so increased that travelling times, on the average, are down by 26.2 per cent. Power is provided by four nose-suspended traction motors on each motor coach driving 43-in. diameter wheels through single-reduction spur gearing. The traction motor is a four-pole series-wound machine with a one-hour weak field rating of 210 h.p. and a continuous rating of 157 h.p. at 675 volts.

Main particulars are as follows:

Line voltage	1,500 volts d.c.
Overall length of three-coach unit	177 ft. 7 in.
Tare weight of three-coach train	104.7 tons
Motor bogie wheelbase	8 ft. 6 in.
Wheel diameter	43 in.
Maximum passenger capacity of the three-coach set	176 seated 220 standing
Gear ratio	71 to 17
Maximum speed	70 m.p.h.

Glasgow Suburban Trains

The Scottish scheme which is part of the 50-cycle a.c. programme of British Railways includes the electrification of the Glasgow suburban lines. For these three-coach train sets have been built by the Pressed Steel Co., Limited, and supplied with Metrovick equipment. These three-coach units consist of one driving trailer coach, one non-driving motor coach and one battery driving trailer coach; two or three units can be coupled together to form six- or nine-coach sets. The individual coaches are not separated in service and are coupled together by a buckeye coupling. The coaches are of saloon type and have air-operated sliding doors electrically controlled from any compartment. At the outer end of each unit, on the battery driving trailer and driving trailer coaches, is a driving compartment, and at one end of the motor coach is a guard's compartment.

Current is collected by Stone-Faiveley single pantographs and taken via an air-blast circuit breaker and main transformer to the rectifiers and then as d.c. to the traction motors.

Main particulars are as follows:

Overall length of three-coach unit	198 ft. 7½ in.
Tare weight	128 tons
Traction motor voltage	975 volts
Motor rating (1 hr.)	220 h.p.
Gear ratio	17 to 70
Maximum speed	75 m.p.h.

(To be continued)

TRIPLEX EXPANSION

Developments at Eccleston

SIX new furnaces are to be installed at the Eccleston factory of the Triplex Safety Glass Co., Limited, as part of a £1 million factory development scheme now being undertaken by Triplex at its factories at King's Norton (Birmingham), Eccleston (St. Helens), and Willesden. It is expected that as a result of the extensions the number of employees at Eccleston will rise by about 275 to approximately 1,200. Four of the furnaces will be bending furnaces, capable also of toughening flat glass, and there will be two multi-stage flat glass furnaces. In the next stage of development five more furnaces of various types may be installed.

In addition, a new raw-glass warehouse with an area of 37,500 sq. ft. is being erected at one end of the factory and a new finished safety-glass warehouse, with an area of 63,600 sq. ft., is being built at the other end of the production line. New inspection conveyors and edge-working machinery are also involved in the development. The extensions to both buildings and equipment are to meet increasing demand for toughened glass from the motor industry. In 1947, the Triplex Eccleston factory employed 170 people and produced 1.5 million sq. ft. of safety glass in the year. In 1960, the corresponding figures are 1,000 employees, with safety-glass production standing at 18 million sq. ft. a year.



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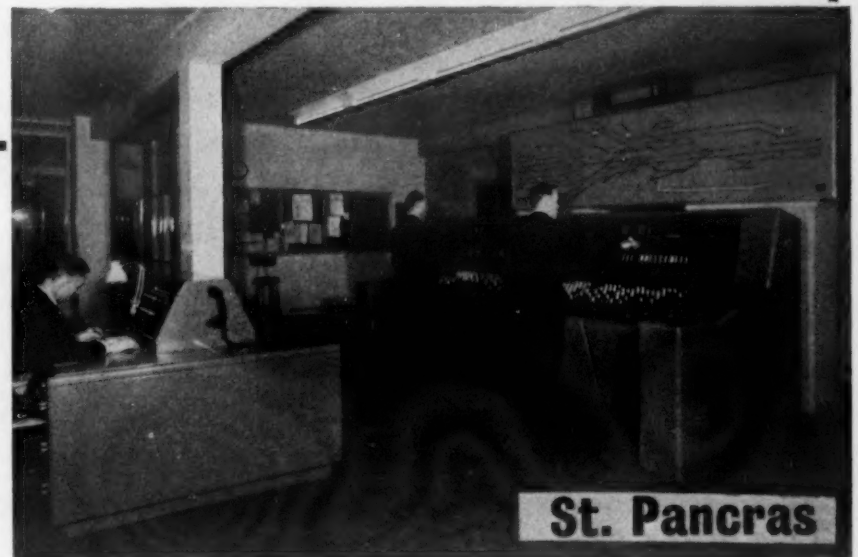


Speed and Safety in Modern Railway Operation



The new Diesel Electric Pullman Trains built by Metropolitan-Cammell Carriage and Wagon Co. Ltd., for the Pullman Car Co. Ltd., are fitted with the Westinghouse two-stage electro-pneumatic high speed brake, which automatically provides increased braking pressures at high speeds.

The Signalling at the London Midland main line terminal station at St. Pancras, is a Westinghouse O.C.S. installation, controlling 205 routes, with electro-pneumatic operation of the 61 pairs of points.



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The Western Region diesel-electric Pullman services from Bristol to London and from Wolverhampton and Birmingham to London begin on September 12; we illustrate the interior of a second-class saloon and, right, the adjustment of a seat in a first-class compartment

MOVING A HEAVY LOAD

150-Ton Transformer from Stafford to Bucks

By A Special Correspondent

THERE is perhaps a tendency towards the view, in these days of modern transport, that there is nothing particularly exciting in the moving of loads by road from A to B, but the writer, who recently had the experience of travelling on a giant transporter operated by B.R.S. Pickfords, holds a different view. From the moment of entering the Birmingham office of B.R.S. Pickfords and making the acquaintance of Mr. S. Bowskill, the area manager, it became increasingly obvious that although to Pickfords the moving of a 150-ton transformer from the English Electric works at Stafford to Iver, Bucks, was just routine, certainly to the less initiated the arrangements being made resembled something of an extremely well-planned military operation.

The careful routing of the giant transformer

Junior Constructor acting as a pusher, one was impressed by the expert co-ordination of the three vehicles, made possible by the excellent teamwork of the three crews assisted by the front-to-rear intercommunication fitted.

Extra large windscreens assuring maximum visibility from the driver's and mate's seats in both vehicles were also readily noticeable. The cabs in each were very spacious, good ventilation being provided as well as a heating and demisting system. Calor gas was also installed to provide hot refreshment for the crew during halts, a very useful facility, particularly in winter, when one considers that a journey such as this can take upwards of five days. Left-hand control in the leading vehicle was seen to be a great asset as distances from fixed objects on the side of the



Negotiating a roundabout on the right hand side on the journey with a 150-ton English Electric transformer from Stafford to Iver



A view into the left-hand-drive cab of the Super Constructor and, above, a close-up of the simple eight-speed gearbox control lever and illuminated gear indicator. The trailer air-brake valve is on the right of the steering column

(a 50-mile detour was necessary at one point to cover barely 100 yards), contacting the necessary B.R.S. branch offices concerned in the journey, careful inspection of the vehicles and trailer prior to commencement of the run and finally the liaison with police authorities in order that police escorts could be arranged throughout the journey were just a few of the preceding arrangements necessary.

Crew Teamwork

Both of the vehicles used for the job were built by Scammell Lorries, Limited—a Super Constructor and Junior Constructor—while the trailer, reputed to be one of the largest in the world and weighing over 200 tons laden, was built by Cranes (Dereham), Limited. Once under weigh, with the giant transformer securely in position on the trailer, the Super Constructor in the lead and the

road could be judged far better with the driver seated on the left. The Crane trailer, which had patented hydraulic suspension, also had power-operated steering bogies, operated by one man at the rear, whereas the pushing vehicle was so anchored to the trailer as to be capable of pushing only, steering being automatically controlled by the coupling.

Superior Transmission

One of the greatest difficulties in heavy haulage tasks of this kind, necessitating the use of more than one tractor, is the synchronisation of gear-changing in the separate vehicles, particularly on gradients, to ensure that each tractor is doing its share of the work and to avoid undue strains in transmissions and couplings and shocks to the cargo. Great advantages in this respect are gained

from the use of semi-automatic transmissions of the type developed by Self-Changing Gears, Limited, Coventry, with which both vehicles concerned in this job were fitted. The RV30 S.C.G. 8-speed gearbox is used in conjunction with an S.C.G. fluid coupling in the Super Constructor and with an S.C.G. fluid-friction automatic clutch in the Junior Constructor.

Continuous Torque

With this gearbox, which requires no clutch pedal, gears are selected simply by operating a small progressive ratchet-type lever attached to the steering column, the gear actually engaged being indicated on an illuminated dial ahead of the driver. An added advantage is that traction is continuous during changes of ratio, which not only makes the synchronisation of gearchanging less critical but enables vehicles of different powers and characteristics to be used without difficulty, as in this case, where the Super Constructor with a 901-cu. in. Leyland diesel engine and 10.25 to 1 final-drive ratio was paired with the Junior Constructor having a Leyland 680-cu. in. diesel and 9.4 to 1 final-drive ratio.

At one point in the journey when passing through a small town, the transporter was as long as the actual high street (136 ft.) and occupying over half of the road; it was at such times that the ready co-operation of the police in clearing a way for the vehicles was appreciated. Negotiating islands was also no small job, many out of necessity having to be taken on the right-hand side. Despite the great total weight of over 230 long tons, at all times, whatever the road conditions, the transporter reacted impeccably and one could have nothing but the highest praise for the vehicles concerned.

Bird's-Eye View

Seated high up in the driving cab one had a bird's-eye view of the oncoming traffic as well as reflected views of traffic coming up from the rear and there were occasions where overtaking motorists approaching oncoming cars gave one some cause for concern. However, the journey was finally safely and satisfactorily completed. The

writer ended an interesting journey with the conclusion that an organisation capable of moving such a load with the minimum of fuss and delay, as was evident, combined with the many qualities of the vehicles employed, backed up by the efficiency and courtesy of the crews themselves, may all be considered to be joint co-operation of a very superior kind and one of which transport can be justly proud.

RAIL LIFE TREBLED

By Hot-Dip Galvanising

BY hot-dip galvanising rails used to carry heavy ore loads, a number of Dutch coal-mine operators are now getting three times the service life previously experienced with uncoated steel rails, according to a spokesman of American Zinc Institute. Information from the Stichting Doelmatig Versinken (the Dutch galvanising trade association) showed that conventional steel rails formerly used in the Dutch mines became corroded and unsafe after two to three years as a result of the constant exposure to water, humidity and chemical attack. Since applying a protective zinc coating by hot-dip galvanising, rails could now be relied on for from five to six years of heavy-duty service.

The extremely aggressive conditions at the mine depths, generally 2,000 to 2,200 ft., attack rails heavily. Since most of the mines contain water at elevated temperatures and have sulphate and sulphide content, unprotected steel rails corrode at an accelerated rate. The Dutch galvanised rails are coated with from 3.2 mils to 4.0 mils of zinc—approximately the equivalent of 2-1/2 oz. per sq. ft. It is said that while the zinc was eroded away by friction on the bearing surface of the rails, this was of no importance since the same friction removed any trace of rust that would tend to develop here. The area where significant corrosive attack was met by galvanising involved the sides and base of the rail.

BRITISH RAILWAYS

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LORRY—BUS—COACH

Disastrous Indian Taxation

RECENT levy of various taxes on road transport may have been a financial necessity, but it was certainly a disaster from the point of view of the future of road transport development, as also was the very low allotment of funds to the development of roads in the Third Plan, if the forecast of Rs. 250 crores was to be the actual allotment. This was stated by Mr. A. E. L. Collins, outgoing chairman of the Madras branch of the Indian Roads and Transport Development Association, at the annual general meeting recently. Mr. Collins is managing director of Ashok Leyland, Limited, an Indian associated company of Leyland Motors, Limited. Mr. Collins said that already there were signs of a recession in sales of commercial vehicles, and many who were planning to make large investments in order to make the future output equal growing demand had to give careful reconsideration to their plans.

It could well be, he went on, that the unprecedented and sudden rise in the price of motor vehicles arising from the new duties just at the very moment when the industry was getting into its stride and everyone was anticipating a possible reduction of prices arising from the recommendations in the ad hoc committee's report on the automobile industry, would be recorded in history in due course as the most ill-advised of all the worldwide legislative interferences with the development of road transport which had taken place from time to time. They could, he thought, easily make a case that starting with the present revenue of Rs. 140 crores per annum obtained from road transport it would be possible for the Government continuously to increase the revenue if it would so reduce the taxation per mile operated that there should be no restriction on the free development of a form of transport which was vital to the country's future welfare.

Air Pressure Failure Alleged

AT Chester last week a fine of £10 was imposed on the North Western Road Car Co., Limited, for using a vehicle with an inefficient braking system. The vehicle, a coach, was alleged to have emerged from a parking site and immediately

Road journeys normally involve no transshipment, whereas rail transport involves transshipment whenever there is a break of gauge. When we make a claim on our road carriers, it is settled within days, and usually in full. When we claim on the railways, it takes an average of six months before a decision is obtained and we do not recover more than half our losses.

"From our Bombay factory to Poona by road, for instance, is for Dalda Rs. 6.50 per ton cheaper than by rail; it is Rs. 3.25 cheaper to take a ton of Sunlight from our Delhi depot to Ludhiana by road than by rail," said Mr. Turner. His remarks form part of a memorandum sent to the Government Committee on Transport Policy and Co-ordination by the Indian Roads and Transport Development Association, the summary point of which is that if traffic between rail and road is apportioned in proportion to investment in tracks and roads, road transport could find immediate employment for 4½ million people and add Rs. 75½ crores to Government revenues.

Change Overlooked

OF the five copies, from different areas, so far received of *Applications and Decisions*, bearing the date September 1 or later, two continue to refer to outdated sections of the Road and Rail Traffic Act, 1933, for example, "section 11 (3)(b)," which is now replaced by section 173 (1)(c) of the Road Traffic Act, 1960. This is the section which covers variations of licences and the rights of objection thereto. The new Act came into force on September 1.

Minimum 2d. Fares to Remain

NEITHER Gosport Borough Council nor Fareham Urban Council are to oppose an application by the Gosport and Fareham Omnibus Company to increase its fares. This was announced by Mr. H. Orme White, managing director of the company, who states that the wage increases would cost the company over £18,000 a year. It proposes to retain the present 2d. minimum fare, while all other single fares will go up by one penny. To help short-distance travellers, two additional



A visitor from Thessaloniki, Greece, this is a German Auwärter Neoplan coach with 36 seats, rear-mounted Henschel diesel engine and air suspension. More than half the roof area is translucent and the side windows are sub-divided vertically, with two half-drop sections

collided with a car and then the front of a cottage, taking the cottage wall with it. The driver was given an absolute discharge. He said in an alleged statement that he applied his brakes but nothing happened. Mr. W. Povey, a Ministry of Transport inspector, said the brakes were operated by air pressure, and he found the air reservoir empty. A pressure gauge acted as a warning to the driver, whose duty it was to check the air pressure before moving. He believed a leak contributed to the brake failure, but he could not say whether this occurred before or after the impact. For the company, Mr. J. J. Rowe said there had been no evidence showing that the system had not been properly maintained.

Ban Kerbside Cars on Bus Routes

DURING the year ended March 31, 1960, Newcastle upon Tyne Transport and Electricity Undertaking made a net profit of £153,648. The general manager, Mr. F. S. Taylor, says that despite the increased use of scooters, cars and motor cycles, the transport undertaking was carrying 42 per cent more passengers than before the war. Referring to traffic congestion, he adds that kerbside parking along bus routes in the city centre should be prohibited, commenting that it was absurd to allow empty cars parked at kerbsides to hold up double-deck buses each carrying 70 to 80 passengers at peak hours.

Road Advantages in India

MOTOR industry manufacturers in India, aghast at the trend in taxation on the industry (see this page), have seized on the favourable report of Mr. H. S. Turner, chairman of Hindustan Lever, Limited, at the annual general meeting of that company earlier in the year when he made factual comment on the advantages of road over rail transport in India. "In 1950," said Mr. Turner, "our normal method of dispatch of finished goods was by rail straight to the dealer and as far as possible in full wagon-loads. This meant that we tied up a great deal of our own capital, the goods spent an average of 21 days in the wagon, and in addition at the end of 1949 we had Rs. 187 lakhs of manufactured goods at the factories because we got wagons very irregularly. It was common experience in those days that for several days we got no wagons and then had sixteen in one day. The man in a small town who had to take a full wagonload of vanaspati might well find himself with four or five months' requirements on his hands at once; and for this tying up of our dealers' capital, of course, we had to pay either in bigger discounts or in letting them make larger profits on stocks in their hands whenever we had to raise our prices."

"Now we have become much more flexible. Last year about 50 per cent of our dispatches were made by road; another 2 per cent were made by 'Quick Transport Service,' a service the railways simply did not offer ten years ago. Our average transit time has been reduced from the 21 days of 1950 to five days now. At our present rate of sale, that means we are saving perhaps Rs. 1½ crores of scarce capital. Moreover we have much less damage.

return tickets of 6d. and 8d. will be introduced which will have the effect of annulling the one penny increase on single fares by taking a return ticket. This means that where a 3d. single journey will, in future, cost 4d., a 6d. return will be available, so that on a return journey there will be no increase.

Lytham Route Changes Considered

PROPOSALS for a reorganisation of bus services were to be discussed on Wednesday this week by a sub-committee of Lytham St. Annes Transport Committee formed for the purpose. The sub-committee will study a comprehensive report prepared by the general manager of the corporation undertaking, Mr. R. C. Armstrong. Proposed improvements to the existing services are designed to cater for areas which have become increasingly residential over the past few years. Property has sprung up on a large scale in some districts of the borough.

Fatal Attraction of Buses

PURLOINING of buses, usually by late-night revellers, is on the increase. Alan Sidney Festorazzi, aged 22, of Westcliff-on-Sea, charged this week at Southend with taking away a bus without consent, was alleged to have confessed to police that he not only took a single-deck Eastern National bus out of the company's Southend garage, but had it refuelled twice on the company's account—once at its Wood Green depot. In the past two weeks he was alleged to have driven off a lorry, a coach and a small van and to have been involved in four accidents. He said he took the bus to gain driving experience.

Transport Development Group

INCOME of the companies in the Transport Development Group in the six months ended June 30 amounted to £3,158,000, compared with £2,057,000 for the whole of 1959; normally, activities are approximately equal in the first and second halves of the year. The interim has been raised from 3 to 4 per cent. The road haulage interests have "withstood remarkably well" the competition of other forms of transport. Cold store business declined due to a fall in meat imports. The offer for Charles Alexander and Partners (Transport), Limited, has so far been accepted by the holders of 92 per cent of the shares.

Bus and Coach Developments

Banstead Coaches, Limited, seeks to suspend Sunday operation of its Banstead—Chipstead Valley Road service in winter. Premier Travel, Limited, and H. V. Richmond apply to use the new bus station at Royston. Yorkshire Traction Co., Limited, proposes to replace its Wath (Montgomery Road)—Thurnscoe service by a Mexborough—Wath—Thurnscoe route. W. and E. F. Kershaw, Limited, Batford, Harpenden, proposes a new service between Aldwickbury Estates and Harpenden (Church Green) via High Firs Crescent, Wheatthampstead Road, Pigottshill Lane, Top Street Way, Station Road and High Street. Sheffield Corporation seeks various new routes and modification in connection with its following tramway abandonment: Pond Street—Hillsborough, Millhouses—Sheffield Lane Top, and Millhouses—Tingley routes would replace the Hillsborough—Firth Park and Exchange Street—Sheffield Lane Top bus services as well as the Beauchief—Vulcan Road tram route.

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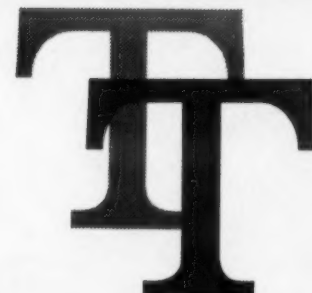
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B.M.C. MOBILE SERVICE

Worldwide Coverage Envisaged

EXTENDING the range of its already widely established instructional facilities, B.M.C. Service, Limited, has recently acquired the first six of a fleet of mobile training units. These vehicles are intended to function as a mobile wing to the permanent training schools that are now maintained in Australia, South Africa, Ghana,

similar instruction to dealers by taking it to them at their own premises. This scheme is really the only practical way of dealing with the problem, since in the majority of cases the dealer's commitments would scarcely permit an extended absence from his business. With a mobile unit this objection does not arise; although the present



Two of the smart new B.M.C. mobile service units pictured at Cowley recently

Canada, the U.S.A. and Great Britain. They will also make periodic visits to the Continent and to any country where B.M.C. distributors may be in need of technical instruction. The British Motor Corporation has roughly 10,000 service stations throughout the world which, apart from the prohibitive distances that are frequently involved, makes it impossible to give training to all personnel in the distributor and dealer network. Because of these difficulties the intake at the schools is limited to the employees of distributors.

The main idea behind the introduction of a fleet of mobile training units is to extend approximately

intention is to deal with small area groups of about half a dozen, locations will be chosen to suit convenience and very little travelling will be involved. In this way the unit will move from group to group throughout an entire area and then return to base. The training syllabus will be flexible and will cater for the varying needs of the individual. Each school will stay in an area for as long as may be warranted by local conditions.

Elegant Bodywork

The bodywork has been built by Marshall Motor Bodies, Cambridge, to a design prepared by a



Toolboard storage behind valences below floor level when on the move; right, an instructor demonstrating details of a brake servo unit to a group of students



B.M.C. drawing office; it is mounted on an Austin long-wheelbase coach chassis powered by a B.M.C. 5.1-litre diesel engine. The overall length of the vehicle is 30 ft., the width 8 ft. and the maximum height 9 ft. 9 in. Externally the prestige value of the vehicle has been fully exploited by giving it an elegant styling and a distinctive livery of B.M.C. blue, with the names of various associated makes of vehicle arranged continuously along the waist. The interior has a tasteful decor in ivory and light grey-blue, which with good natural lightings gives a clean bright effect and an air of almost clinical efficiency.

Large Working Spaces

The main body of the vehicle constituting the school section has a length of 17 ft. 6 in. and is divided from the cab by a door. The cab has been designed on a commodious scale to ensure adequate comfort for the crew on long and arduous journeys. Access to the main section is by double doors with folding steps in the side of the vehicle; as a safety precaution the engine cannot be started until the double doors are fully closed. An air-conditioning unit fitted in the school section provides heating in winter and air conditioning in summer. Strip lighting, air conditioning and a calibrating machine operate from outside power supplies, while emergency lighting is taken from a battery. As a precaution against possible interference from outside noise and climatic conditions, the complete body shell is insulated with 2-in.-thick resin-bonded glass fibre.

The schools are fully equipped to provide train-

ing instruction for both cars and commercial vehicles. Leather upholstered tubular chairs, which can be stacked into a compact space when not in use, allow seating for nine students. Diesel pump test equipment is fitted and a comprehensive range of service tools is carried. These are mounted on tool boards which clip to the inner sides of the vehicle during demonstration and training. When in transit they are stored in compartments accessible from the outside of the vehicle and located beneath the floor.

Equipment Stowage

Considerable storage space for equipment and technical literature, including supplies of work-stop manuals and parts lists, is provided by steel containers installed over the rear wheel arch on one side and in a range of drawers built in beneath the rear window. Removable containers may also be fitted along the side and over the wheel arch on the clear side of the interior when they are needed. When the schools are in transit all the equipment is stowed and secured in much the same way as it would be on board a ship.

Two instructors will accompany each vehicle in order that adequate coverage may be given to both car and commercial vehicle problems. In order that all training is completely in accord with the latest practice, instructors will be changed at frequent intervals. When not on tour they will take up duties at the permanent schools where they will be able to bring themselves up to date. On overseas assignments the time limit will be three months, when a replacement will be flown out to take over the duties of any instructor who is due for return.

For the initial stage of the scheme the mobile training schools will operate in the United Kingdom to gain experience with the best methods of operation. Later the services will be extended on a worldwide basis in accordance with the policy of B.M.C. Service, which company has proved beyond question that its organisation is an indispensable adjunct to successful selling.

SIMPLIFIED BODY CONSTRUCTION

Aluminium In Insulated Container

ONE of the wide variety of profiles in which aluminium sheet is now available has been put to use in the construction of a new insulated trailer made by C. L. Whitaker and Co., Limited, Grimsby, a firm specialising in refrigerated and insulated vehicles. The trailer is designed for conveying perishables preserved either by dry ice or by continuous temperature control. With either method the controlling air must circulate freely round the load and for this reason the load must not be placed flush against the sides of the vehicle.



Insulated body built on B.T.C. trailer by C. L. Whitaker and Company using Noral Miniature Mansard aluminium sheet

In the past this has been accomplished by fitting separate strips of beading at regular intervals on the interior surface of the vehicle.

The lining of the trailer just completed has been constructed from Noral corrugated aluminium sheeting in Miniature Mansard profile, made by Northern Aluminium Co., Limited. This sheet has a ridge at regular intervals and thus provides both a lining sheet and beading in one. This gives a considerable saving in assembly time, provides a neat finish and eliminates crevices between the beading and the sheet, an advantage from the point of view of hygiene. The floor of the vehicle is formed from $\frac{1}{8}$ -in. aluminium treadplate, all joints of which have been welded by the argon arc method to prevent moisture and fish slime penetrating the insulating material under the floor.

The trailer is 26 ft. long, 7 ft. 8 in. wide and 7 ft. 6 in. high. The outer skin is of 18 s.w.g. Noral M57S aluminium-alloy sheet. The insulating material is foamed polystyrene and is 5 in. thick in the sides and 6 in. thick in the roof and floor. The chassis was supplied by the British Trailer Co., Limited.

Although not fitted on the vehicle illustrated, provision is made for fitting a Thermo King refrigeration unit on the front bulkhead.

New and cheaper oxygen and acetylene regulators are now being marketed by British Industrial Gases, Limited, Enfield, on which cylinder contents are indicated by a calibrated plunger instead of a gauge. Two new types of pressure hose introduced by the company include a twin-bore hose, which avoids the use of two separate runs from cylinders to tool, and a hose developed for use with propane.

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SOCIAL AND PERSONAL

L.M.R. Line Traffic Managers

THE scheme for a second stage of the decentralisation of traffic management on the London Midland Region of British Railways was outlined this week. Divisional traffic managers, already appointed under stage one, will report to three newly appointed line traffic managers, instead of, as at present, to region headquarters in London. The line traffic managers themselves will be solely responsible to the general manager. The line traffic managers will be:

North and north-western part of the region, with headquarters in Manchester: Mr. M. G. E. Lambert, now divisional traffic manager, Liverpool Division.

Western part, from London to Crewe, including Birmingham area, with headquarters in Crewe: Mr. J. Royston, now divisional traffic manager, Manchester Division.

Midland part, from London to Derby, including Leicester and Nottingham areas, with headquarters in Derby: Mr. R. L. E. Lawrence, now divisional traffic manager, London Division.

We regret to record the death, at the age of 53, of Mr. J. D. Millner, manager for Ferodo, Limited, in the Irish Republic.

Mr. C. F. Wolsey, M.Inst.T., general manager of Douglas Corporation Transport Department, who is next week concerned in the arrangements for the M.P.T.A. conference there, has completed 50 years in municipal service. He is believed to have the longest continuous service with one municipal undertaking, having gone to Douglas in 1932, 28½ years ago.



Mr. C. F. Wolsey

The Corporation Transport Department has had only two general managers since its inception in 1902. Eldest son of a retired Midland Railway man, he joined Lowestoft Corporation in 1910 and gained experience in various spheres of local Government, including transport. In 1919 he joined the traffic section of Sheffield Corporation and in 1930 was appointed traffic superintendent at Stockport, whence he went to the Isle of Man.

Mr. J. R. Hammond, general manager, Western Region, has accepted the office of president of the Railway Students Association for the session 1960-61. The opening meeting will take place on October 19, when Mr. Hammond will deliver his presidential address.

Mr. R. Felgate has been appointed sales executive (northern accounts) of Rubery, Owen and Co., Limited, at Darlaston, and Mr. R. Maxwell Sinclair has been appointed motor division European representative. He will be based on Darlaston and responsible for all the motor division accounts on the Continent of Europe, including Scandinavia.

Mr. J. Mannion, overhead line superintendent, Derby Corporation Omnibus Department, retired on September 1.

The late Mr. J. C. Sword, pioneer of bus and air services in Scotland, who died on March 27, left estate valued at £112,512.

We record with regret the death in Akron, Ohio, of Mr. W. A. Hazlett, who for 17 years was managing director of the Goodyear Tyre and Rubber Co. (Great Britain), Limited. He was 73.

The Minister of Aviation, Mr. Peter Thorneycroft, has reappointed Mr. A. C. Ping as a member of the board of British European Airways for a further two years.

Crypton Equipment, Limited, Bridgwater, has recently appointed Mr. J. C. Hurn, chief technical consultant, as manager of the new educational and training division.

The Cunard Steam-Ship Co., Limited, announces that Mr. E. Seymour-Bell, C.B.E., is to retire as general manager of the company in the United States on September 30. He is to be succeeded by the present U.S. deputy general manager, Mr. W. Y. Daly.

The Mersey Docks and Harbour Board has appointed Mr. N. A. Matheson to be engineer-in-chief, in succession to Mr. J. D. J. Saner, M.C., who is retiring at the end of the year. Mr. W. E. Sutton is announced as assistant secretary to the Board.

Mr. George Rumley, who is employed in the traffic department of Bristol Omnibus Co., Limited, is a keen stamp collector. He has just collected a prize of £50 for the winning design of a new stamp to be issued by the Sierra Leone Government. The competition was open to all comers, professional designers and laymen alike.

The following have been elected officers of the Coachmakers and Coach Harness Makers Company for the ensuing year: Master, Sir Reginald Verdon Smith; Senior Warden, Colonel G. A. Norris; Renter Warden, Mr. P. S. Croall; Junior Warden, Lieutenant-Colonel R. T. Harris.

The centenary of the opening of London Victoria Station on October 1 will be marked by a visit to the station arranged by the Railway and Canal Historical Society, followed by a short lecture by Mr. Charles E. Lee. A weekend visit to the Isle of Wight and the remains of canals between Guildford and Portsmouth is being held on September 17 and 18.

When loco men in the London district of the London Midland Region of British Railways drew their back pay under the awards given them by the Guillebaud Committee their thoughts turned



Railwaymen mayors entertained to luncheon by Mr. J. R. Hammond, general manager, Western Region, at Paddington

Back row (left to right): Messrs. A. C. Parker (assistant regional establishment and staff officer); H. E. R. Bastin (district traffic superintendent, Bristol); G. A. V. Phillips (divisional traffic manager, Paddington); R. L. Charlesworth (commercial officer); H. G. Bowles (assistant general manager); Alderman E. J. Powell (Mayor of Carmarthen); R. A. Smedley (chief mechanical and electrical engineer); C. W. Powell (operating officer); C. J. Rider (public relations and publicity officer); H. E. A. White (running and maintenance officer).

Front row (left to right): Alderman S. W. E. Salter (Mayor of Liskeard); Councillor A. J. Evans (Mayor of Llanelli); Councillor R. J. Pengelly (Mayor of Fowey); Councillor D. J. Boon (Mayor of Barry); Mr. J. R. Hammond (general manager, Western Region); Alderman A. H. Kinchin (Mayor of Oxford); Alderman J. John (Chairman, Cardigan-shire County Council); Alderman J. E. Jones (Mayor of Pwllheli); Councillor W. A. Cox (Mayor of Exeter); Councillor F. J. Smith (chairman, Glamorgan County Council) was unable to attend.

As from September 1, Mr. G. R. Francis is appointed traction engineer to British United Traction, Limited. He will be responsible for initiating and progressing all new traction installations for both shunting locomotives and railcars.

We are informed that there are still vacancies for the Institute of Transport weekend course at New College, Oxford, on September 16-19. The subject is the inter-relation of inland and international transport and the speakers will be Major-General G. N. Russell (who will preside), Mr. R. L. H. Farmer, Mr. S. A. Finnis, Mr. L. J. H. Horner and Mr. John F. Parke. Any members of the Institute wishing to join the course should get in touch with the secretary immediately.

On August 31 Mr. W. M. Hall, general manager of Liverpool Transport, presented to Mr. W. J. Miller, A.M.Inst.T., the commercial assistant of the department, a gold watch and a pair of binoculars on behalf of his colleagues, on his retirement after over 48 years' service in the department. Mr. Miller has served under five general managers, having joined the department as an office boy. In 1943 he was appointed a member of the financial officers committee of the Municipal Passenger Transport Association.

A 35,000-mile round-the-globe tour of the world's commercial vehicle markets is to be made by Mr. Geoffrey Cozens, who has just retired as managing director of Commer Cars, Limited, and Karrier Motors, Limited. He remains on the boards and is succeeded as general manager by Mr. R. Watson Lee, hitherto director and general manager of Rootes Motors (Parts), Limited. Mr. Cozens joined the Rootes Group in 1922 and became general manager of the Kent depot. In 1932 he became director and general manager of Rootes, Limited, Birmingham. He moved to Commer Cars in 1937 and soon after was appointed managing director.

to others perhaps less fortunate than themselves. From the sheds at Kentish Town, Cricklewood, Neasden, Bedford and St. Albans a sum of nearly £60 was collected and sent to the secretary manager of the St. Christopher's Orphanage at Derby, which aids orphans left by railway servants.

Mr. E. H. Kinsella has been appointed head of the freight development section, North Eastern Region, B.R.

The London office of A. P. Newall and Co., Limited, has been moved to 19-20 Grosvenor Street, London, W.1. The telephone number is Hyde Park 3342.

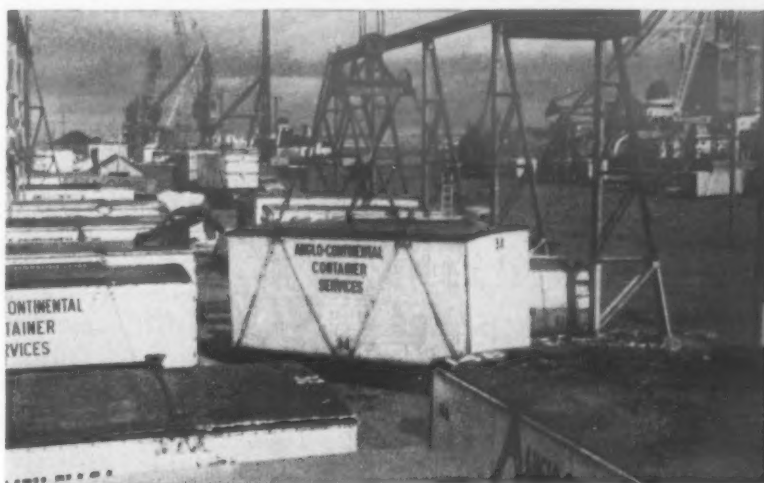
Mr. J. L. Mumby has been appointed financial director and secretary of the Goodyear Tyre and Rubber Co. (Great Britain), Limited, in succession to Mr. W. R. Booth who has returned to the United States Goodyear company. Mr. Mumby was formerly secretary-treasurer of Goodyear in Peru.

Following completion of formalities for the acquisition by the British Aircraft Corporation of a controlling interest in Hunting Aircraft, Limited, Sir George Edwards and Mr. W. Masterton have been elected to the board of Hunting Aircraft and Mr. G. L. Hunting and Mr. R. R. S. Cook have left it. Sir Percy Hunting is chairman and Sir George vice-chairman.

The British Transport Commission announces the following appointments:

Mr. B. Robinson to be traffic costing officer, York.
Mr. P. Moore, to be senior solicitor assistant.
Mr. F. H. Gee, to be fuel supplies officer.
Mr. D. L. Bartlett, to be assistant director of research (engineering), Derby.
Mr. E. H. Grose, from the Westinghouse Brake and Signal Co., Limited, to be assistant (development), signal engineering department.
Mr. C. A. Scott, personal assistant to deputy chairman, B.T.C., to be secretary, Scottish Area Board.

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CLASSIFIED ADVERTISEMENT

RATES.—The minimum charge for classified advertisements is 7s. for 14 words or less, and 6d. for each additional word. The name and address of the advertiser is charged at the same rate. If a box number is used 2s. extra is charged to cover our name and address and postage. If set in paragraph form each paragraph is estimated separately. Official Notices and semi-display in the classified columns are charged at the rate of 48s. per single column inch.

ACCEPTANCE.—Advertisements can be accepted up to 2.30 p.m. on Monday to ensure insertion in the current week's issue. MODERN TRANSPORT is on Sale every Friday.

SITUATION VACANT
PROSPECTS for man under 25 interested in all aspects of transport operation to train as a Technical Journalist. Give particulars of age, education, and experience in transport. Apply to Secretary, Modern Transport Publishing Co., Limited, Russell Court, 8-16 Woburn Place, London, W.C.1.

[Another Classified Advertisement appears on page 2]

IMPORTANT CONTRACTS

Dartford-Purfleet Tunnel Approach

AWARD of a £758,755 contract for the construction of the southern approach road to the Dartford-Purfleet Tunnel to Sir John Jackson, Limited, London, is announced by the Ministry of Transport. The approach road starts at a two-level junction with Princes Road, Dartford (A2) with underpasses and slip roads to eliminate cross traffic. From this junction, the road will curve northwards to the tunnel entrance. It will pass under Watling Street (A296) and London Road (A226) and over the North Kent lines of British Railways. The northern approaches to the tunnel are well advanced. The two halves of the tunnel excavations, from shafts sunk in the river banks, met last year and the outward drives from the shafts to the portals have been completed. Tenders are about to be invited for the completion of the tunnel itself. The whole scheme including the approaches will cost more than £11,000,000 and is expected to be completed in 1962.

Lansing Bagnall Trucks Order

An order for 24 industrial trucks worth £65,000, has been placed with Lansing Bagnall, Limited, Basingstoke, by the Standard-Triumph organisation. The order is for 22 electric-powered 2-ton capacity reach trucks and two trailer-towing tractors for use in the Standard-Triumph factory at Coventry.

Fleet Standardises Perkins Engines

Sun Printers, Limited, Watford, plans to standardise on Perkins diesel engines throughout its fleet of 25 vehicles, 14 of which are already fitted with Perkins engines. The Sun fleet carries about 950 tons of periodicals daily to destinations in the London area. Mainly on local work, the P6 engines average 15 m.p.g. and the P4s about 20 m.p.g.

Fluidrive For Drewry And Hudswell Clarke

The Drewry Car Co., Limited, has ordered a further 53 size 23 traction-type fluid couplings for diesel locomotives for British Railways, which already has more than 300 of this type of shunting locomotive in service. The power unit comprises a Gardner 8L3 diesel engine of 204 h.p. at 1,200 r.p.m., Fluidrive and five-speed Wilson-Drewry air-operated epicyclic gearbox. Also for locomotives for British Railways, Hudswell Clarke and Co., Limited, has ordered 10 size 23 scoop-control fluid couplings. These locomotives will also be powered by the Gardner 8L3 engine, the fluid coupling driving through a three-speed two-range S.S.S. Powerflow gearbox, made by Bostock and Bramley, Limited.

Napier Elands For Quebecair

Another civil airline in North America is to operate British aero engines in Canadair 540 aircraft. An order has been placed by Quebecair for two Canadair 540s equipped with Napier Eland turboprop engines. One aircraft—the Napier-Canadair jointly owned demonstrator—has been leased to Quebecair while its new machines are being completed and is already in service on the

operator's routes in Quebec Province. With the prospect of Government approval being granted for the opening up of new routes to the west of Quebec, Quebecair plans to establish a fleet of Canadair 540s. The Eland-engined Canadair 540 has proved itself, in local service operations in the U.S.A., to be ideally suited for short to medium stages. Operating costs so far in service have proved to be well below estimated figures.

Harrington-Albion Again For Charlie's Cars

Having been an exclusive Harrington coachwork user since 1934 and an Albion chassis user even longer, Charlie's Cars (Bournemouth), Limited, again selected a similar combination for six new coaches added to this operator's fleet during the summer. The new vehicles comprise Albion Aberdeen underfloor-engined chassis and Harrington Cavalier 41-seat luxury coach bodies, incorporating interior heating, transistorised address equipment and the patented Harrington vertical-sliding side-locker doors.

Ferranti Airstream For Royal Navy

Ferranti, Limited, has received a £250,000 contract from the Ministry of Aviation for its new Airstream direction detector system, which is to be fitted as standard equipment to all Scimitars, Sea Vixens and Blackburn NA39 aircraft for the Royal Navy. The system, which has taken two years to develop in collaboration with Specialities, Inc., in America, which company had the basic idea, provides the pilot with continuous angle-of-attack information, thereby increasing the safety factor in aircraft. It also enables an aircraft to be flown on the best part of the lift-drag curve to maintain economic flight conditions, maximum climb-away and minimum take-off and approach speeds, and consequently is likely to be of great interest also to civil airline operators.

FINANCIAL RESULTS

NOTES on the trading results, dividends and financial provisions of companies associated with the transport industry are contained in this feature, together with details of share issues, acquisitions and company formations or reorganisations.

Raydyot

James Neale and Sons, Limited, one of the oldest companies manufacturing accessories, etc., for the motor and allied trades under the registered trade name of Raydyot now feels that it would be of advantage to all if the trading title of the company was more closely linked to that of the manufactured product. Therefore, the title of the company has been changed to Raydyot, Limited.

Wagon Repairs

The directors of Wagon Repairs, Limited, state that the improvement in group profits is attributable to the continued growth of the subsidiary company—Handy Angle, Limited. The demand for slotted angle in steel and alloys, shelving, accessories and materials handling equipment, both at home and in overseas markets, has steadily increased. Activities in repairing and overhauling privately owned rail vehicles and rail tank cars employed in oil, petrol and chemicals traffic are being well maintained.

SHIPPING and SHIPBUILDING

Channel Island Ships

THE second new passenger ship for British Railways' Channel Islands services was launched at Cowes this week. Her name, *Sarnia*, chosen by Guernsey, was the Roman name for the island. Built by J. Samuel White and Co., Limited, she is due for delivery next spring. She follows her sister ship, the *Caesarea*, which was launched in January, 1960, and is now nearing completion. Almost identical, the two ships will be the largest ever built for the Channel Islands routes and the biggest which can be handled at St. Helier. They will bring a new standard of one-class comfortable travel to the services.

A big problem on the older, smaller, ships—designed when the annual holiday rush to the Channel Islands was much smaller—is that during peak periods there is too little sheltered seating for daylight trips and insufficient sleeping accommodation for night crossings. The new ships will have 110 berths in private cabins and lounges and most of the seating will be under cover. The *Sarnia* is a twin-screw turbine ship 321 ft. long overall, a deadweight of 640 tons and a speed of 20 knots. Denny-Brown stabilisers are incorporated. Accommodation will be one class only.

Ferry Service from Miami

A FERRY service started between Miami and Puerto Mates de Galvez in Guatemala recently. Refrigerated railway cars or lorries can be run straight on to the vessel. Accommodation is also being provided for cars, as an incentive for tourists wishing to approach Guatemala by sea.

Unusual Building Task

THE middle section of an ore-carrying ship, without bows and stern, has been launched at the Schlieker shipyards in Hamburg, ready to be towed across the Atlantic and up the St. Lawrence Seaway to the Canadian Great Lakes. The bows and stern of the obsolete T-3 tanker *Chiwawa* will be welded on to the 510-ft. middle section at Lorain, Ohio. The complete vessel will be a 23,000-ton ore carrier in the Great Lakes trade.

Medway Harbour Launch

A HARBOURMASTER'S launch for the Medway Conservancy Board was recently launched at the Hampton boatyard of John I. Thornycroft and Co., Limited. The launch, whose dimensions are 57 ft. in length with a beam of 13 ft. 6 in. and a draft of approximately 3 ft. 9 in., will be for the use of the harbourmaster and for general harbour service duties, operating from Sheerness. Powered by two Thornycroft turbocharged diesel marine engines each capable of developing 200 b.h.p., she will have an anticipated speed of 16 knots.

A Canadian decorative and industrial laminate named Arborite is now being marketed in the United Kingdom for the first time by a newly formed British subsidiary of the manufacturer, the Arborite Co., Limited, Montreal, which has recently taken offices and warehouse accommodation at Bilton House, Uxbridge Road, Ealing.

BUTYL RUBBER

Esso to Build U.K. Plant

INTENTION to construct a plant at the Esso Refinery, Fawley, for the manufacture of Butyl rubber has been announced by Esso Petroleum Co., Limited; the new plant will cost about £4.3 million, will have an annual capacity of 30,000 tons and is estimated to take between two and three years to build. Butyl rubber, which was discovered by Esso Research chemists, has a unique combination of properties. It is universally employed for the manufacture of inner tubes and has also established itself for use in electric cables, conveyor belts, tank linings and rubber components as a general-purpose rubber exhibiting superior resistance to heat, chemical attack and atmospheric weathering.

American Experience

Following American experience, an anticipated large-scale use of Butyl rubber is in the manufacture of high-quality tyres. Among the advantages claimed for Butyl rubber tyres are improved braking and road holding with superior riding comfort and absence of squeal on cornering.

The capacity of the new Esso plant when completed, is expected to meet all United Kingdom requirements for Butyl rubber for a considerable period and, furthermore, it will permit the company to supply export markets. At present all Butyl rubber is imported into the United Kingdom from the United States and Canada.

FORTHCOMING EVENTS

- September 11.—H.C.V.C. Fifth annual old lorry rally. Cranes Close, Basildon. 2.30 p.m.
- September 12-16.—Municipal Passenger Transport Association. Conference at Douglas, I.O.M.
- September 12-16.—International Air Transport Association. Annual meeting. Copenhagen.
- September 13.—R.C.T.S. (East Midlands). Meeting and film show. Thurland Hall, Nottingham. 7.30 p.m.
- September 13.—A.F. John Stroud, "Here and There." Imperial Hotel, Elizabeth Street, S.W.1. 7 p.m.
- September 14.—L.R.T.L. R. Copson, "Postwar Hamburg." 153 Drummond Street, N.W.1. 7 p.m.
- September 16-19.—Inst. T. Weekend Course. New College, Oxford.
- September 18.—S.C.T.S. Bus tour of Southampton and visit to graving dock and locomotive shed.
- September 19.—R.C.T.S. (Merseyside). G. O. B. Clark, "Main-Line Diesel Locomotives." Woodside Hotel, Birkenhead. 7.30 p.m.
- September 19.—H.M.R.S. T. L. Jones, "Welsh Railways Records." Keen House, Calshot Street, W.1.
- September 20.—I.Loco.E. President address by D. C. Brown. 1 Birdcage Walk, S.W.1. 5.30 p.m.
- September 22.—R.C.T.S. (West Riding). George Dow, "Railway Heraldry." Railway Institute, Yorks. 7.15 p.m.
- September 23.—R.C.T.S. O. J. Morris, "L.B.S.C.R. Suburban Services." 163 Eversholt Street, N.W.1. 7.15 p.m.
- September 23-October 1.—Commercial Motor Show. Earls Court.
- September 24.—O.S. Annual dinner. Clarendon Restaurant, Hammersmith, W.6. 7 for 7.30 p.m.
- September 24.—A.F. Annual dinner. Gatwick Airport.
- September 26.—I.R.S.E. (Bristol). O. S. Nock, "Signalling from the Driver's Point of View." Bristol Temple Meads Station. 6 p.m.
- September 29.—Rly. C. Visit to the Archives of the British Transport Commission. 6.45 p.m.
- September 30.—I.Nav. Capitaine de Frigate L. Ouder and Captain J. Poll, "The Flow of Maritime Traffic." University of Southampton Navigation School, Warsash. 4 p.m.
- B.L.S. Visit to the Bitterley branch by freight train, leaving Ludlow 11.30 a.m. including inspection of the cable worked incline at Clee Hill.

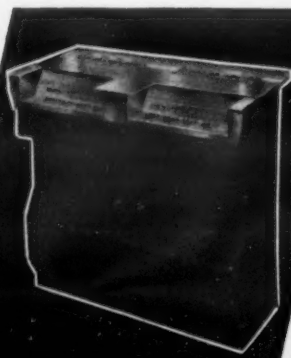
FARE COLLECTION

SYSTEMS

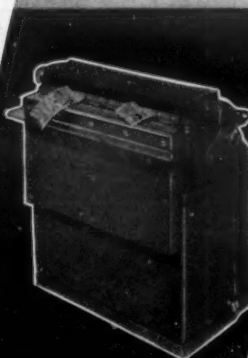
Speed, ease, accuracy — these are the qualities everywhere associated with

BELL PUNCH machines, four of which are shown here.

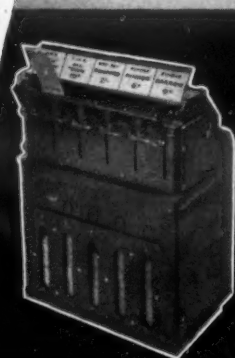
TOP SPEED TICKET ISSUE with BELL PUNCH

THE S.P.
For railways

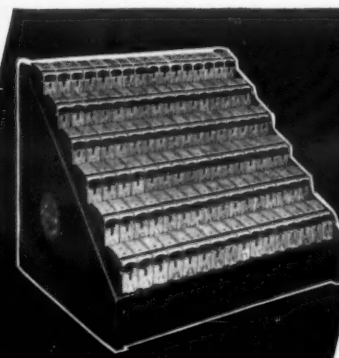
Self printing for speed and accuracy, issuing 2 tickets per second.

THE SOLOMATIC
For one-man bus operation

Pre-printed coloured tickets from driver to passenger in a second — automatic overprint of stage, date, etc.

THE ULTIMATIC
For railways

Speedy issue of pre-printed coloured tickets with automatic dating.

THE BELLMATIC
For railways

Handy container units for clean, compact ticket storage.



If you would like full information about these or about the many other products in the BELL PUNCH range, let us put you in touch with the BELL PUNCH distributor in your part of the world. He will gladly advise you on the BELL PUNCH method best suited to your needs.

BELL PUNCH EXPORT CO. LTD., 39 ST. JAMES'S STREET, LONDON, S.W.1 (CABLES: BELLPUNCH LONDON)

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